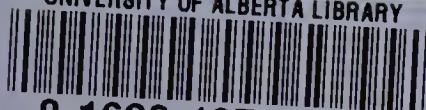


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# Houghton Mifflin **3** Mathematics Teacher's Resource Book

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Irvin K. Burbank

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Houghton Mifflin Canada Limited

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# Houghton Mifflin Mathematics

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# Introduction

## Development

*Houghton Mifflin Mathematics* is developed in six strands: **Numeration, Arithmetic, Geometry, Measurement, Graphing** and **Problem Solving**. The first five strands are treated in a *block* approach. Fourteen 24-page units are devoted to the strands. This allows for continuity and easier reinforcement and retention of mathematical skills. Problem Solving is an integral part of the entire program and is treated within all of the five other strands. (See *Problem Solving*.)

A typical unit of *Houghton Mifflin Mathematics* contains eight lessons, each on a two-page layout. Each lesson treats only one objective. The objectives are numbered by a computer code to allow easy tracking of skills for reinforcement and remediation. (See *Learning Objectives*, Page T13.) This approach provides learning in “bite-sized bits” to ensure students master the objective before proceeding to the next level of difficulty.

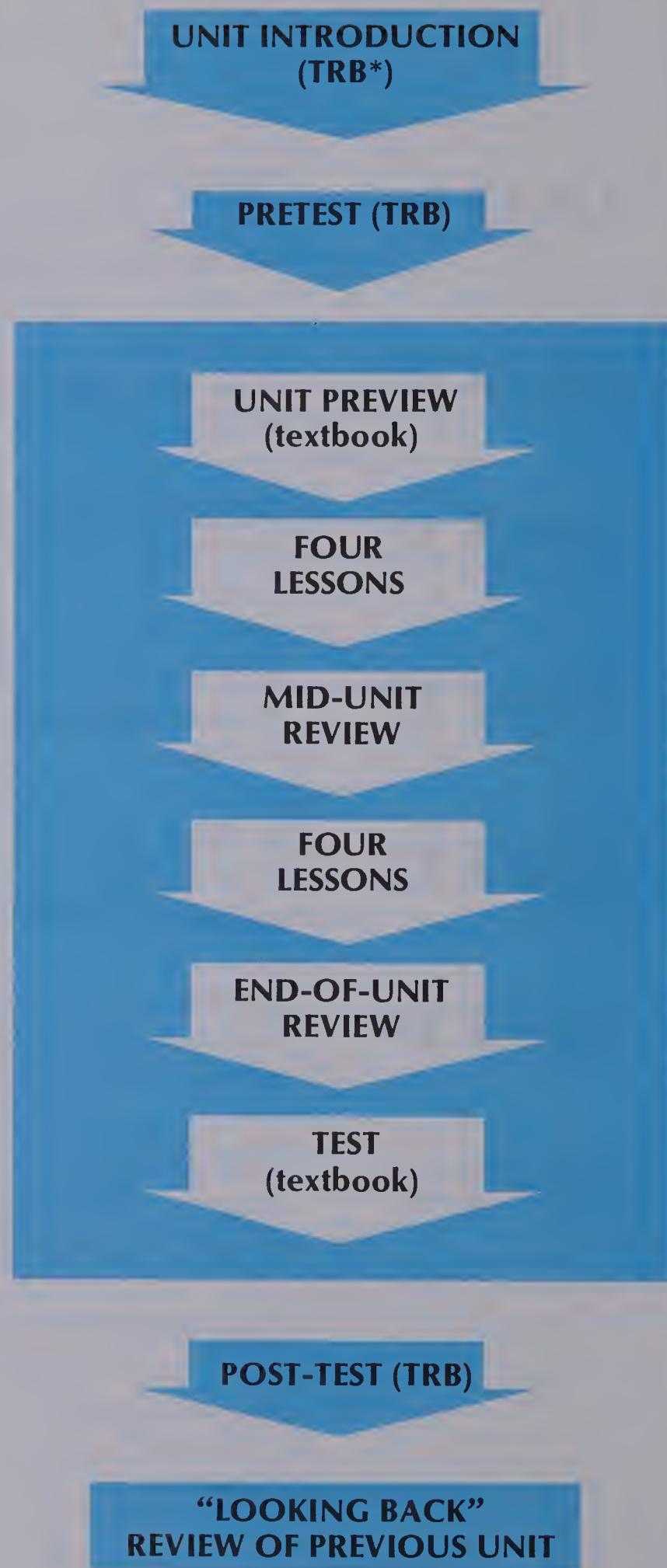
## Organization

A typical unit of *Houghton Mifflin Mathematics* follows the sequence shown in the flow chart.

The Introduction in the TRB (Teacher’s Resource Book) will give some mathematical and pedagogical background to the unit. As well, the *Ideas* section provides some useful suggestions for integrating the theme and/or other subject areas with the mathematical content of the unit.

The “Preview” is simply a practice page that reviews some prerequisite skill that will be needed for success in the core lessons of the unit. The lessons are organized in two sections with a mini-review after each section. The “Looking Back” page provides practice in the main strand of the previous unit.

A typical unit will take about three weeks including introductory activities, lessons, reviews, and tests. This allows one day for most lessons. It may be suggested that more time be spent on certain important or difficult topics. Enriched classes may cover a unit in two weeks, while others may take four or more weeks.



\*Teacher’s Resource Book

# Review and Testing

The authors of *Houghton Mifflin Mathematics* recognize the importance of skill reinforcement so that students remember what they have been taught from week to week and from year to year. The textbook and *Teacher's Resource Book* have been designed to provide efficient review and testing resources at the times when they will be most useful. The program contains the following features.

An optional **Pretest** in the TRB. This will be especially useful early in the school year to gauge your students' ability. However, some students may have already learned some later topics in different strands, so the pretest may be used with discretion throughout the school year. Once the level of the students' ability has been placed, the pretest may still be used as a practice sheet or an extra post-test.

A **mid-unit Review** provides practice in all objectives covered in the first half of a unit. With all testing material, the questions are clearly labelled by objective. A chart in the TRB points the lesson and page number where each skill can be reviewed if necessary.

An **end-of-unit Review** provides practice in all the objectives of the second half of the unit and has the same diagnostic features as the mid-unit Review.

The **Test** in the textbook provides clusters of questions on each objective. The test may be designed simply for extra practice.

A **Post-test** is reproduced in the TRB and has the advantage that the students have had no prior access to it.

The **Looking Back** at the end of each unit provides extra practice and reinforcement in the strand covered by the previous unit.

**Extra Practice** is available for every lesson in Houghton Mifflin's Testing and Practice Masters. The half-page black-line masters are reproduced with answers in the TRB.

**Cumulative Tests** for groups of units are provided in the back of the textbook.

The back pages of the textbook also provide **Extra Practice** in core objectives of the grade level.

Unit 2

Pretest

Add or subtract

- $\begin{array}{r} 6 \\ +6 \\ \hline \end{array}$
- $\begin{array}{r} 11 \\ -8 \\ \hline \end{array}$
- $\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$
- $\begin{array}{r} 8 \\ +9 \\ \hline \end{array}$
- $\begin{array}{r} 15 \\ -6 \\ \hline \end{array}$
- $5 + 8 =$
- $4 + 9 =$
- $10 - 7 =$
- $18 - 9 =$
- $\begin{array}{r} 41 \\ +26 \\ \hline \end{array}$
- $\begin{array}{r} 92 \\ +7 \\ \hline \end{array}$
- $\begin{array}{r} 35 \\ -12 \\ \hline \end{array}$
- $\begin{array}{r} 87 \\ -36 \\ \hline \end{array}$
- $\begin{array}{r} 48 \\ -18 \\ \hline \end{array}$
- $\begin{array}{r} 27 \\ +9 \\ \hline \end{array}$
- $\begin{array}{r} 43 \\ +8 \\ \hline \end{array}$
- $\begin{array}{r} 25 \\ +5 \\ \hline \end{array}$
- $\begin{array}{r} 36 \\ -7 \\ \hline \end{array}$
- $\begin{array}{r} 51 \\ -4 \\ \hline \end{array}$

20. REVIEW

25. A1 Add

- $\begin{array}{r} 7 \\ +6 \\ \hline \end{array}$
- $\begin{array}{r} 2 \\ +9 \\ \hline \end{array}$
- $\begin{array}{r} 5 \\ +7 \\ \hline \end{array}$
- $\begin{array}{r} 8 \\ +5 \\ \hline \end{array}$
- $\begin{array}{r} 6 \\ +4 \\ \hline \end{array}$

27. A2

29. A3 Add

- $\begin{array}{r} 8 \\ +3 \\ \hline \end{array}$
- $\begin{array}{r} 5 \\ +1 \\ \hline \end{array}$
- $\begin{array}{r} 6 \\ +4 \\ \hline \end{array}$
- $\begin{array}{r} 8 \\ +9 \\ \hline \end{array}$
- $\begin{array}{r} 9 \\ +1 \\ \hline \end{array}$

34. A4

35. A6

36. Jo has How

TEST UNIT 2

Add or subtract

Name \_\_\_\_\_

Post-test Unit 2

Add or subtract

- $\begin{array}{r} 7 \\ +5 \\ \hline \end{array}$
- $\begin{array}{r} 4 \\ +6 \\ \hline \end{array}$
- $\begin{array}{r} 8 \\ +7 \\ \hline \end{array}$
- $\begin{array}{r} 15 \\ -9 \\ \hline \end{array}$
- $\begin{array}{r} 16 \\ -7 \\ \hline \end{array}$
- $5 + 9 =$
- $9 + 7 =$
- $12 - 6 =$
- $17 - 8 =$

LOOKING BACK

ADD / SUBTRACT

Add

- $\begin{array}{r} 3 \\ +5 \\ \hline \end{array}$
- $\begin{array}{r} 24 \\ +4 \\ \hline \end{array}$
- $\begin{array}{r} 53 \\ +44 \\ \hline \end{array}$
- $\begin{array}{r} 430 \\ +19 \\ \hline \end{array}$
- $\begin{array}{r} 503 \\ +184 \\ \hline \end{array}$
- $\begin{array}{r} 9 \\ +6 \\ \hline \end{array}$
- $\begin{array}{r} 47 \\ +6 \\ \hline \end{array}$
- $\begin{array}{r} 25 \\ +36 \\ \hline \end{array}$
- $\begin{array}{r} 854 \\ +29 \\ \hline \end{array}$
- $\begin{array}{r} 626 \\ +137 \\ \hline \end{array}$
- $\begin{array}{r} 70 \\ +89 \\ \hline \end{array}$
- $\begin{array}{r} 64 \\ +58 \\ \hline \end{array}$
- $\begin{array}{r} 714 \\ +97 \\ \hline \end{array}$
- $\begin{array}{r} 507 \\ +197 \\ \hline \end{array}$
- $\begin{array}{r} 618 \\ +294 \\ \hline \end{array}$
- $\begin{array}{r} 1604 \\ +163 \\ \hline \end{array}$
- $\begin{array}{r} 8563 \\ +218 \\ \hline \end{array}$
- $\begin{array}{r} 5119 \\ +3467 \\ \hline \end{array}$
- $\begin{array}{r} 3669 \\ +4054 \\ \hline \end{array}$
- $\begin{array}{r} 2758 \\ +2758 \\ \hline \end{array}$

Name \_\_\_\_\_

Extra Practice Worksheet A1 Pages 22-23

Add or subtract

Cumulative Test

UNITS 1-4

Cop

- Add
- $\begin{array}{r} 8 \\ +0 \\ \hline \end{array}$
- $\begin{array}{r} 9 \\ +4 \\ \hline \end{array}$
- $\begin{array}{r} 6 \\ +7 \\ \hline \end{array}$
- $\begin{array}{r} 3 \\ +5 \\ \hline \end{array}$
- $\begin{array}{r} 8 \\ +9 \\ \hline \end{array}$

Writ

- $6 \times 9 + 7$
- $7 \times 3 + 8$
- $8 \times 4 + 5$
- $9 \times 6 + 8$
- $10 \times 7 + 9$

10.  $\begin{array}{r} 30 \\ +2 \\ \hline \end{array}$

11.  $\begin{array}{r} 74 \\ +6 \\ \hline \end{array}$

12.  $\begin{array}{r} 58 \\ +7 \\ \hline \end{array}$

13.  $\begin{array}{r} 56 \\ +5 \\ \hline \end{array}$

14.  $\begin{array}{r} 9 \\ +36 \\ \hline \end{array}$

15.  $\begin{array}{r} 36 \\ +51 \\ \hline \end{array}$

16.  $\begin{array}{r} 46 \\ +27 \\ \hline \end{array}$

17.  $\begin{array}{r} 62 \\ +24 \\ \hline \end{array}$

18.  $\begin{array}{r} 58 \\ +33 \\ \hline \end{array}$

19.  $\begin{array}{r} 74 \\ +36 \\ \hline \end{array}$

20.  $\begin{array}{r} 4 \\ +2 \\ \hline \end{array}$

21.  $\begin{array}{r} 8 \\ +3 \\ \hline \end{array}$

22.  $\begin{array}{r} 24 \\ +14 \\ \hline \end{array}$

23.  $\begin{array}{r} 16 \\ +53 \\ \hline \end{array}$

24.  $\begin{array}{r} 356 \\ +213 \\ \hline \end{array}$

25.  $\begin{array}{r} 356 \\ +213 \\ \hline \end{array}$

26.  $\begin{array}{r} 416 \\ +5 \\ \hline \end{array}$

27.  $\begin{array}{r} 607 \\ +8 \\ \hline \end{array}$

28.  $\begin{array}{r} 86 \\ +254 \\ \hline \end{array}$

29.  $\begin{array}{r} 846 \\ +57 \\ \hline \end{array}$

30.  $\begin{array}{r} 65 \\ +238 \\ \hline \end{array}$

31.  $\begin{array}{r} 407 \\ +305 \\ \hline \end{array}$

32.  $\begin{array}{r} 174 \\ +237 \\ \hline \end{array}$

33.  $\begin{array}{r} 335 \\ +176 \\ \hline \end{array}$

34.  $\begin{array}{r} 218 \\ +362 \\ \hline \end{array}$

35.  $\begin{array}{r} 699 \\ +105 \\ \hline \end{array}$

36.  $\begin{array}{r} 3857 \\ +153 \\ \hline \end{array}$

37.  $\begin{array}{r} 643 \\ +1228 \\ \hline \end{array}$

38.  $\begin{array}{r} 574 \\ +3268 \\ \hline \end{array}$

39.  $\begin{array}{r} 4369 \\ +138 \\ \hline \end{array}$

40.  $\begin{array}{r} 507 \\ +4197 \\ \hline \end{array}$

41.  $\begin{array}{r} 3594 \\ +5609 \\ \hline \end{array}$

42.  $\begin{array}{r} 2788 \\ +2585 \\ \hline \end{array}$

43.  $\begin{array}{r} 6487 \\ +1036 \\ \hline \end{array}$

44.  $\begin{array}{r} 3296 \\ +5917 \\ \hline \end{array}$

45.  $\begin{array}{r} 3897 \\ +5984 \\ \hline \end{array}$

46.  $\begin{array}{r} 0.4 \\ +0.3 \\ \hline \end{array}$

47.  $\begin{array}{r} 0.8 \\ +0.5 \\ \hline \end{array}$

48.  $\begin{array}{r} 6.9 \\ +4.7 \\ \hline \end{array}$

49.  $\begin{array}{r} 14.3 \\ +8.9 \\ \hline \end{array}$

50.  $\begin{array}{r} 97.32 \\ +187.67 \\ \hline \end{array}$

51.  $0.9 + 0.7$

52.  $41.8 + 2.7$

53.  $189.4 + 8.5$



# Problem Solving

Problem Solving is an area of study receiving increased emphasis in the elementary mathematics curriculum. It is not enough for students simply to master basic mathematical skills. In today's world, they must be able to apply those skills to solve practical, real-world problems.

The first step in this process involves interpretation of simple, routine problem situations, given first in pictures, then in words. Beyond that, a complete mathematics program must give the students an armoury of strategies with which to attack all types of problems, routine and non-routine. Such strategies include drawing diagrams, guesswork, using a model, estimation, looking for patterns, making lists, simplifying or rewording the problem, and many more. In grades 4 to 6, *Houghton Mifflin Mathematics* teaches a simple four-step strategy for attacking routine word problems. See the Scope & Sequence on page T21 for a complete list of problem-solving objectives for this grade level.

*Houghton Mifflin Mathematics* deals with problem solving in six different ways.

## 1. Lesson Introductions.

Every possible lesson is introduced with a word problem. This puts the mathematical concept in a real-world context and also gives the student experience with the key words and phrases that may be used in problems associated with the mathematical objective.

## 2. Practice Section.

Every possible lesson includes more problems in the *Practice* section. The students are given experience with the different ways similar types of problems can be phrased. Thus, they should then be better able to recognize problems by type when they encounter them in sets of mixed problems.

## 3. Problem Solving Lessons.

Almost every unit has at least one full lesson on problem solving. These lessons familiarize the students with different types of problems and with strategies for attacking them.

## 4. Something Extra.

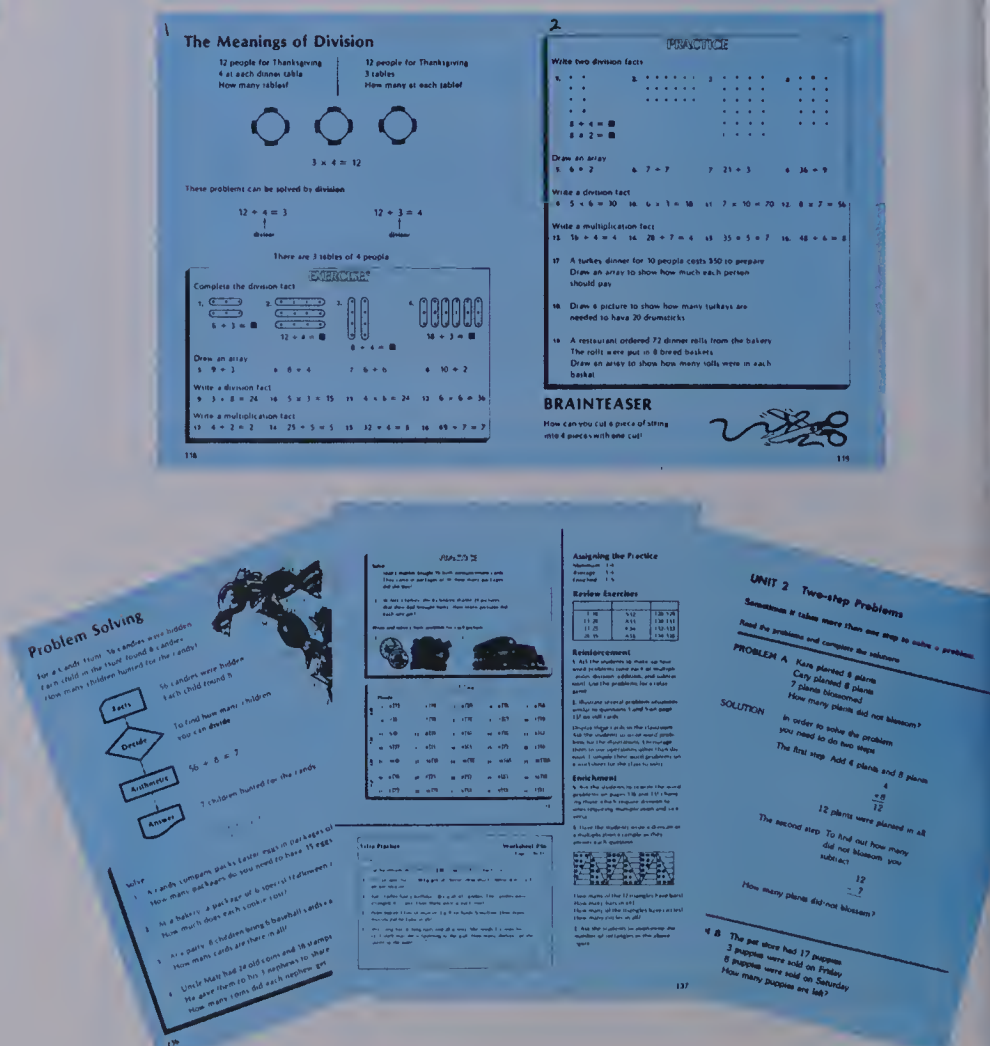
The section in the textbook at the bottom right of every lesson provides more challenging non-routine problems for enrichment.

## 5. Teacher's Resource Book and Practice Masters.

The Teacher's Resource Book provides extra material for all levels of ability. The Extra Practice sections provide more problems for the average student. These are available separately on Houghton Mifflin's *Testing and Practice Masters*. The *Reinforcement* sections provide ideas for alternative types of practice and for re-teaching for students of lower ability. The *Enrichment* section provides challenges for better students, and also give ideas for open-ended (divergent) mathematical investigations.

## 6. Problem Solving Activities.

Every grade level has a separate booklet of problem solving activities, correlated to the lessons in the textbook. These booklets provide ample opportunity for students to extend their problem solving abilities even further.





# Mathematics for the 80's

Are these your priorities?

**P**

**Problem Solving**

**R**

**Real-World Applications**

**I**

**In-Depth Developmental Lessons**

**O**

**One Strand Block Units**

**R**

**Ready-to-Use Teacher's Resource Books**

**I**

**Individualized Learning Materials**

**T**

**Testing and Management Programs**

**Y**

**Year-Round Motivational Features**

...Then here is your program!

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**Mathematics 1**



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Houghton Mifflin  
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**Mathematics 5**



Houghton Mifflin  
**Mathematics 6**



# Houghton Mifflin Mathematics



# The Student Text and Teacher Resource Book

Student Objectives coded for easy tracking and reviewing.

Functional, full colour illustrations.

Introductory activity emphasizing prerequisite skills, using concrete experiences.

Textbook develops skills from problem solving, real world situations.

Lesson plan involving both concrete materials and textbook pages using pictorial representation (semi-concrete).

Developmental Exercises to work with the students to assure that the objective is mastered.

Teacher's Resource Book page number corresponds to pupil's textbook.

## UNIT 3 LESSON 2

### Objective A10

Add two- and three-digit numbers, regroup tens.

### Introducing the Lesson

Show the students the following models and ask them about the regrouping that should be done.



2 flats, 12 rods, 4 cubes

The students should decide that the 12 rods can be regrouped as 1 flat and 2 rods.



3 flats, 2 rods, 4 cubes

Summarize the modelling with these place-value charts:

100s	10s	1s	=	100s	10s	1s
2	12	4		3	2	4

Try several other similar examples.

### Teaching the Lesson

Discuss the bowling problem at the top of page 48. Model the required addition with place-value number blocks. Point out that it is easiest to add cubes first.



"Adding cubes, there are 6. Add the rods. Since there are 12 rods, regroup them as 1 flat and 2 rods. Then add."



3 flats, 2 rods, 6 cubes  
or, 3 hundreds, 2 tens, 6 ones  
or,  $300 + 20 + 6$   
or, 326

Have the students practise modelling and recording several other similar addition examples. Use problems with three addends as well.

48

## Regrouping Tens

MY SCORES ARE 175 AND 151. WHAT'S MY TOTAL?



Write the question

175

+ 151

6

12 tens is 1 hundred and 2 tens

Regroup

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

1

175

+ 151

326

The total score for the 2 games is 326

EXERCISES									
Add									
1. 47	2. 52	3. 65	4. 90	5. 81	6. 347	7. 152	8. 565	9. 290	10. 381
+ 60	+ 64	+ 83	+ 33	+ 84	+ 60	+ 64	+ 83	+ 33	+ 84
107	116	148	123	165	407	216	648	323	465
11. 274	12. 490	13. 528	14. 742	15. 382	16. 451	17. 163	18. 283	19. 394	20. 671
+ 382	+ 255	+ 191	+ 170	+ 382	+ 450	+ 466	+ 571	+ 482	+ 291
656	745	719	912	764	901	629	854	876	962

48

### Using the Exercises

- Questions 1 to 5 are paired with Questions 6 to 10 to provide practice first with regrouping tens with two-digit addends and then with regrouping tens with a three- and a two-digit addend.
- Questions 11 to 20 provide examples with three-digit addends requiring the regrouping of tens.

The **Teacher's Resource Book** provides black-and-white reproductions of the textbook pages with full answers and annotations.

Description of developmental exercises aids in teaching the skill and diagnosing problems.

# Provide a complete learning and teaching package.

**PRACTICE**

Find the sum

52	2. 78	3. 43	4. 60	5. 35
+ 67	+ 91	+ 92	+ 84	+ 83
119	169	135	144	118
161	7. 472	8. 553	9. 661	10. 391
+ 263	+ 180	+ 283	+ 174	+ 267
424	652	836	835	658
274	12. 451	13. 584	14. 293	15. 341
+ 274	+ 478	+ 95	+ 91	+ 245
548	929	679	+ 102	+ 231
			486	817

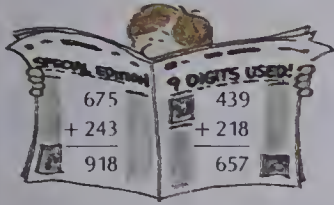
Solve

During a bowling tournament, Sam scored 180 and 178 for his first two games. What was Sam's total score for these two games? **358**

Joanne was practising for a bowling tournament and scored 189 and 191 on two games. What was her total score for the two games? **380**

**Special Addition**

The addition question below uses all of the digits from 1 to 9. Each digit is used just once.



Write up other addition questions like the ones above.

Answers may vary

49

**Practice**

Write the number as hundreds and tens

1. 46 tens = 4 hundred + 6 tens

2. 46 tens = 4 hundreds + 6 tens

3. 18 tens = 1 hundred + 8 tens

4. 18 tens = 1 hundred + 8 tens

343	6. 256	7. 480	8. 544	9. 347
182	+ 71	+ 390	+ 95	+ 261
5	327	870	639	608
182	11. 396	12. 68	13. 290	14. 328
777	+ 112	+ 341	+ 675	+ 280
9	508	409	965	608

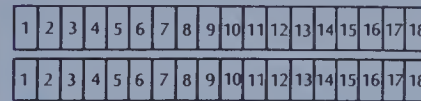
**Worksheet A10**  
Pages 48-49

## Assigning the Practice

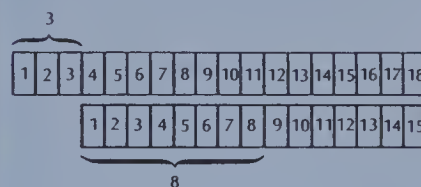
Minimum: 1-10  
Average: 1-17  
Enriched: 6-17

## Reinforcement

Students can make "adding machines" according to the following directions: Cut out two centimetre square strips. There should be at least 18 squares on each strip. Number the squares from left to right.



To add, for example,  $3 + 8$ , move the bottom strip so its left end is at the edge of the '3' square of the top strip. Then find the '8' on the bottom strip. The sum of 3 and 8 is above the '8' on the bottom strip.



## Enrichment

1. The *Special Addition* challenge, page 49, will have to be solved by a method of trial and error. It provides addition practice, but may be frustrating for all but the highly motivated students.

2. Ask the students to find a true statement about each:

- the sum of two even numbers;
- the sum of two odd numbers; and
- the sum of an even number and an odd number.

## Problem Solving Activities

Assign Level 4, page 6.

Assignments for students of 3 levels of ability.

Practice exercises for skill mastery.

Reinforcement provides alternative types of practice and ideas for reteaching.

Word problems in every possible lesson.

Enrichment in both textbook and Teacher's Resource Book to keep the gifted child involved.

Extra Practice Masters (available separately) are reproduced here for every lesson.

Extra Problem Solving Activities (available separately) for each unit.

Houghton Mifflin Mathematics was developed by an experienced team of educators and consultants from across Canada.

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# Houghton Mifflin Mathematics

## P R I O R I T Y

### PROBLEM SOLVING

- ☐ Sequenced lessons teach problem solving strategies.
- ☐ The unique IDEA strategy keeps your pupils on track.
- ☐ Problem solving questions in every lesson maintain performance.

### REAL-WORLD APPLICATIONS

- ☐ Every unit is developed through a real-world theme.
- ☐ Lessons are introduced by a real-world problem.
- ☐ Exercises include real-world applications.

### IN-DEPTH DEVELOPMENTAL LESSONS

- ☐ Each lesson is devoted to a single objective.
- ☐ Skills are based upon understanding, using concrete materials.
- ☐ Developmental exercises make objectives easy to learn.

### ONE STRAND BLOCK UNITS

- ☐ Each unit is devoted to the development of one strand.
- ☐ Each unit provides thorough practice for objectives.
- ☐ Each unit reviews, tests, and reinforces objectives.

### READY-TO-USE TEACHER'S RESOURCE BOOKS

- ☐ The Resource Book contains detailed lesson plans.
- ☐ The Resource Book provides both reinforcement and enrichment activities.
- ☐ The Resource Book has complete answers to exercises and practice.

### INDIVIDUALIZED LEARNING MATERIALS

- ☐ Every unit provides Pre-tests and Post-tests for readiness and assessment.
- ☐ Every unit has provisions for remediation and enrichment.
- ☐ Every unit has built-in reviews and cumulative reviews

### TESTING AND MANAGEMENT PROGRAMS

- ☐ The textbook has unit tests and cumulative tests.
- ☐ The Resource Book contains extra practice and evaluation material.
- ☐ The Resource Book uses coded objectives to establish a diagnostic system.

### YEAR-ROUND MOTIVATIONAL FEATURES

- ☐ Every lesson has functional and appealing artwork.
- ☐ Every lesson has a challenging "Something Extra" including calculator activities and computer literacy.
- ☐ Every unit has an interesting child-oriented theme.

#### Book 1

1-98001  
1-98011  
1-98021  
1-98031

Pupil's Workbook  
Teacher's Resource Book  
Testing and Practice Masters  
Problem Solving Activities

#### Book 2

1-98002  
1-98012  
1-98022  
1-98032

Pupil's Workbook  
Teacher's Resource Book  
Testing and Practice Masters  
Problem Solving Activities

#### Book 3

1-98003  
1-98013  
1-98023  
1-98033

Pupil's Textbook  
Teacher's Resource Book  
Testing and Practice Masters  
Problem Solving Activities

#### Book 4

1-98004  
1-98014  
1-98024  
1-98034

Pupil's Textbook  
Teacher's Resource Book  
Testing and Practice Masters  
Problem Solving Activities

#### Book 5

1-98005  
1-98015  
1-98025  
1-98035

Pupil's Textbook  
Teacher's Resource Book  
Testing and Practice Masters  
Problem Solving Activities

#### Book 6

1-98006  
1-98016  
1-98026  
1-98036

Pupil's Textbook  
Teacher's Resource Book  
Testing and Practice Masters  
Problem Solving Activities



# Learning Objectives

The following objectives are covered in depth in *Houghton Mifflin Mathematics 3*.

## Numeration

		Lesson	Pages
N1	Read and write numerals up to 99.	1-1	2-3
N2	Read and use ordinals and dates to the thirty-first (31st).	2-6	32-33
N3	Read and write numerals to 999.	3-1	42-43
N4	Count to 999 forward and backward by ones, tens, and hundreds.	3-2	44-45
N5	Write numerals in expanded form, table form, and standard form.	3-3	46-47
N6	Compare and order numbers to 999 using the symbols $<$ and $>$ .	3-4	48-49
N7	Read and write numerals to 9999 and count to 9999.	3-8	56-57
N8	Skip count by twos, threes, fours, fives, and tens.	7-1	122-123
N9	Round a numeral to the nearest ten or the nearest hundred.	9-6	172-173
N10	Write the fraction for the shaded part of a region.	13-6	252-253
N11	Compare two fractions with the same denominator.	13-7	254-255
N12	Write the fraction for part of a set.	13-8	256-257
N13	Interpret and write decimals to 0.9.	14-1	262-263
N14	Interpret and write decimals to 9.9.	14-2	264-265
N15	Compare and order decimals to 9.9.	14-3	266-267
N16	Interpret and write decimals to 9.99.	14-6	272-273
N17	Introduce Roman numerals to 20.	15-4	288-289

## Arithmetic

		Lesson	Pages
A1	Add numbers with sums to 10, 11, and 15.	1-2	4-5
A2	Add numbers with sums to 12, 13, and 14.	1-4	8-9
A3	Add numbers with sums to 16, 17, and 18.	1-5	10-11
A4	Add three one-digit numbers.	1-6	12-13
A5	Relate addition and subtraction facts to 10 and to 11.	2-1	22-23
A6	Subtract 1 and 10 and count back by ones and tens.	2-2	24-25
A7	Subtract 9 and subtract using doubles to 18.	2-3	26-27
A8	Subtract from 12 and 13 by counting back strategies.	2-5	30-31
A9	Use <i>bridging with 10</i> strategy for subtraction facts to 18 with emphasis on 14 to 17 facts.	2-7	34-35
A10	Add two 2-digit addends without regrouping.	4-1	62-63
A11	Add 2-digit and 1-digit addends, regrouping ones.	4-2	64-65
A12	Add two 2-digit addends, regrouping ones.	4-3	66-67
A13	Add two 2-digit addends, regrouping tens.	4-5	70-71
A14	Add two 2-digit addends with regrouping.	4-6	72-73
A15	Add four 1-digit addends with sums to 29.	4-7	74-75
A16	Subtract 2-digit numerals without regrouping.	5-1	82-83
A17	Subtract 1-digit numerals from 2-digit numerals with regrouping.	5-2	84-85
A18	Subtract 2-digit numerals with regrouping.	5-3	86-87
A19	Subtract 2-digit numerals from 3-digit numerals with 2-digit differences.	5-5	90-91
A20	Find the difference between two numerals requiring regrouping from zero in the minuend.	5-6	92-93
A21	Check addition and subtraction problems by the inverse operation.	5-7	94-95
A22	Relate multiplication to addition for products to 21 in horizontal form.	7-2	124-125
A23	Understand the order property for multiplication with products to 21 in horizontal form.	7-3	126-127
A24	Multiply with 2 as a factor in products to 18.	7-5	130-131
A25	Multiply with 5 as a factor in products to 45.	7-6	132-133
A26	Multiply with 3 as a factor in products to 27.	7-7	134-135
A27	Multiply with 4 as a factor in products to 36.	7-8	136-137
A28	Introduce the meaning of division for the basic facts to 21.	8-1	142-143
A29	Relate multiplication and division facts to 21.	8-2	144-145
A30	Divide by 2 with dividends to 18.	8-3	146-147

A31	Divide by 5 with dividends to 45.	8-4	148-149
A32	Divide by 3 with dividends to 27.	8-5	150-151
A33	Divide by 4 with dividends to 36.	8-6	152-153
A34	Use zero and one in division.	8-7	154-155
A35	Add two 3-digit addends, regrouping ones.	9-1	162-163
A36	Add two 3-digit addends, regrouping tens.	9-2	164-165
A37	Add two 3-digit addends with regrouping.	9-3	166-167
A38	Add three 2-digit addends with regrouping.	9-4	168-169
A39	Add three 3-digit addends.	9-5	170-171
A40	Estimate sums of 2-digit and 3-digit addends.	9-7	174-175
A41	Subtract 3-digit numerals with regrouping from the tens place.	10-1	182-183
A42	Subtract 3-digit numerals with regrouping from the hundreds place.	10-2	184-185
A43	Subtract 3-digit numerals with regrouping.	10-3	186-187
A44	Subtract 3-digit numerals with zero tens in the minuend.	10-5	190-191
A45	Multiply in vertical form with products to 45.	12-1	222-223
A46	Multiply with 6 as one of the factors.	12-2	224-225
A47	Multiply with 7 as one of the factors.	12-3	226-227
A48	Multiply with 8 as one of the factors.	12-5	230-231
A49	Multiply with 9 as one of the factors.	12-6	232-233
A50	Divide in vertical form with dividends to 45.	13-1	242-243
A51	Divide by sharing to find the number in each group, given the number of groups.	13-2	244-245
A52	Introduce remainders with dividends to 49.	13-3	246-247
A53	Divide by 6 and 7 with dividends to 63.	13-4	248-249
A54	Divide by 8 and 9 with dividends to 81.	13-5	250-251
A55	Add and subtract decimals to 1.8.	14-5	270-271
A56	Multiply a one-digit number by 10 and 100.	15-5	290-291
A57	Multiply a one-digit number by a multiple of 10.	15-6	292-293
A58	Multiply a one-digit number by a two-digit number, without regrouping.	15-7	294-295
A59	Multiply a one-digit number by a two-digit number, regrouping the ones.	15-8	296-297

## Measurement

		Lesson	Pages
M1	Estimate and measure length in centimetres.	1-3	6-7
M2	Find the perimeter of triangles by measuring and adding.	1-7	14-15
M3	Experience the importance of 10 in the metric system by estimating and measuring lengths in decimetres and centimetres.	2-4	28-29
M4	Estimate and measure in metres, decimetres, and centimetres relating these units to place-value concepts.	3-5	50-51
M5	Identify and write money amounts to \$99.99 relating these to place-value concepts.	3-6	52-53
M6	Relate kilometres and metres.	4-4	68-69
M7	Find the perimeters of rectangles and squares by adding.	4-8	76-77
M8	Choose gram or kilogram as appropriate units.	6-1	102-103
M9	Estimate and measure mass.	6-2	104-105
M10	Estimate temperature and read a Celsius thermometer to one-degree intervals.	6-4	108-109
M11	Tell time to five-minute intervals.	6-5	110-111
M12	Tell time to one-minute intervals for dial and digital clocks.	6-6	112-113
M13	Read and write dates and order days, months, years, and seasons.	6-8	116-117
M14	Subtract money amounts to \$9.99.	10-6	192-193
M15	Measure area using non-standard units and square centimetres.	12-7	234-235
M16	Use multiplication to find the area of a rectangle.	12-8	236-237
M17	Estimate and measure capacity using 1 L, 0.5 L, and 0.1 L containers.	14-4	268-269
M18	Use decimals to relate measurements involving centimetres and metres.	14-7	274-275
M19	Find volume using non-standard units.	15-1	282-283
M20	Find volume using cubic centimetres as the standard unit.	15-2	284-285



# Geometry

		Lesson	Pages
G1	Identify and construct common-plane, closed figures.	5-4	88-89
G2	Identify equal and unequal portions.	10-4	188-189
G3	Identify and investigate symmetric figures.	10-8	196-197
G4	Identify and investigate straight line segments and points.	11-1	202-203
G5	Identify and construct common geometric solids.	11-2	204-205
G6	Identify and investigate the faces of common solids.	11-3	206-207
G7	Identify the edges and corners of common solids.	11-4	208-209
G8	Identify similar and congruent figures.	11-5	210-211
G9	Perform slides of figures on grids.	11-7	214-215

# Graphing

		Lesson	Pages
GR1	Interpret and construct bar graphs.	6-3	106-107
GR2	Use a number pair to name a location on a grid.	11-6	212-213
GR3	Interpret and construct pictographs.	12-4	228-229

# Problem Solving

		Lesson	Pages
PS1	Use only relevant numbers in word problems.	1-8	16
PS2	Locate information for addition questions from a short paragraph.	1-8	17
PS3	Associate word problems with appropriate concrete models, pictorial models, and equations.	2-8	36
PS4	Draw appropriate pictures not suggesting movement for addition and subtraction word problems.	2-8	37
PS5	Locate information from a picture or table and compare amounts to \$99.99.	3-7	54
PS6	Regroup numbers into standard form and discover recurring patterns.	3-7	55
PS7	Identify key phrases found in addition and subtraction word problems.	5-8	96
PS8	Organize information from a paragraph for addition and subtraction problems.	5-8	97
PS9	Compare measurements involving time, length, and mass.	6-7	114
PS10	Use a concrete model to solve addition problems involving time.	6-7	115
PS11	Choose the correct operation in solving a word problem.	7-4	128
PS12	Use relevant information in solving a word problem.	7-4	129
PS13	Choose the correct operation in solving a word problem.	8-8	156
PS14	Supply an assumed number to solve a word problem.	8-8	157
PS15	Count on using coins.	9-8	176
PS16	Make change to \$5.00.	9-8	177
PS17	Solve two-step word problems involving addition and subtraction.	10-7	194
PS18	Follow a flow chart.	10-7	195
PS19	Sort and classify solids.	11-8	216
PS20	Summarize information in a report.	11-8	217
PS21	Use addition or subtraction with amounts to \$9.99.	14-8	276
PS22	Relate amounts to \$9.99 with decimal numbers.	14-8	277
PS23	Choose the kind of measurement and the way of measuring.	15-3	286
PS24	Choose the operation needed to solve word problems.	15-3	287

# Student Record Chart

for Pretests, Book Tests, and Post-tests

## Numeration

N1					
N2					
N3					
N4					
N5					
N6					
N7					
N8					
N9					
N10					
N11					
N12					
N13					
N14					
N15					
N16					
N17					

## Geometry

G4				
G5				
G6				
G7				
G8				
G9				

## Graphing

GR2				
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## Measurement

M1				
M2				
M3				
M4				
M5				
M6				
M7				
M8				
M9				
M10				
M11				
M12				
M13				
M14				
M15				
M17				
M18				
M19				
M20				

## Arithmetic

A1					
A2					
A3					
A4					
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A6					
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A11					
A12					
A13					
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A16					
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A31					
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A52					
A53					
A54					
A55					
A56					
A57					
A58					
A59					

# Scope & Sequence

2

3

4

## NUMERATION

Read and write numerals to 20/  
1-20  
Read and write numerals to 100/  
45-66  
Read and write numerals to 999/  
109-128  
Compare and order/11-14, 53-54,  
59-60, 113-114  
Read and write amounts of  
money/15-16, 65, 121-126,  
223-224  
Ordinal numbers/61-62  
Round to the nearest 10/63-64  
Fractions: halves, fourths, thirds,  
and tenths/213-218  
Decimal notation/219-220  
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Ordinal numbers/32-33  
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172-173  
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Two-digit numerals/1-3  
Three-digit numerals/4-5  
Four-digit numerals/6-7  
Six-digit numerals/10-11  
Decimal notation/150-153, 310-  
315  
Comparing/2-11, 146-147, 153  
Money/8-9, 80-81  
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months/165  
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Area/101-102  
Capacity/229-231  
litre/230  
Mass/225-228, 231  
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kilometre/68-69  
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square centimetre/234-237  
Volume/282-286  
cubic centimetre/284-285  
Capacity/268-269  
litre/268-269  
millilitre/269  
Mass/102-105  
kilogram/102-105  
gram/102-105  
Temperature/108-109  
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222, 226-227, 296, 322-323  
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kilometre/72-73  
decimetre/154-155  
Perimeter/176-177  
Area/214-217  
square centimetre/216-217  
square metre/216-217  
Volume/218-221  
cubic centimetre/220-221  
cubic metre/220-221  
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litre/88-89  
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 No regrouping/32-33, 36-37  
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 Zero and one/100-101  
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 tion/168-169  
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# UNIT 1

## Addition Facts

Theme: Sports

Lesson		Objective	Vocabulary	Materials
Preview		Review sums to 9.	addition facts, doubles, plus, equals	sports pictures, flash cards for sums to 10
1	N1	Read and write numerals up to 99.	numerals, ones, tens, standard form, counting on, tens and ones, expanded form	dimes and pennies
2	A1	Add numbers with sums to 10, 11, and 15.	sums, addition twin, addition names for 10	15 discs, 15 bottles, flash cards with sums to 10, 11, 15
3	M1	Estimate and measure length in centimetres.	centimetres, estimate, measure, unit of length, nearest centimetre	centimetre square strips, centimetre rulers
4	A2	Add numbers with sums to 12, 13, and 14.	equation, number line, additional table	centimetre strip rulers, number line
5	A3	Add numbers with sums to 16, 17, and 18.	even numbers, patterns	addition table transparency, discs, flash cards with sums to 16, 17, 18
6	A4	Add three one-digit numbers.	addends, finding a 10	chalkboard hockey, scoreboard
7	M2	Find the perimeter of triangles by measuring and adding.	perimeter, triangle, sides, distance	simple plane polygons, centimetre strings and rulers
8	PS1	Use only relevant numbers in word problems.	word problems, information, extra information	sports equipment or pictures
	PS2	Locate information for addition questions from a short paragraph.	in all, total, altogether	
100 Chart		Count by 10s and 9s.	pattern	
Test		Addition facts to 18.		



# About This Unit

The mastery of the addition facts to 18 is the primary focus of Unit 1. Careful development of numerals to 100 is also begun as a preview of Unit 3 (learning the numerals to 9999).

The *patterns* approach to the addition facts to 100 is based upon successful classroom practice and on research findings. Students should not be asked to learn the addition facts in an unorganized manner (the *shotgun* approach), or in merely an artificially organized manner (the *smaller to larger* approach). The Houghton Mifflin facts development program incorporates conceptual fact families (sums to 10 in Lesson 2, doubles in the review and Lesson 5); simple unifying relationships (adding 9 treatment in Lesson 5, finding 10s in Lesson 6); and a proven spiral sequence for memorization.

An understanding of addition requires that the student manipulate materials and recognize unifying patterns. Mastery of an addition fact (defined as 3-second recall under various conditions) requires memorization. This task can be made enjoyable for children by adhering to certain guidelines.

1. Focus mastery drill on manageable subsets of the addition facts.
2. Utilize meaningful subsets based on unifying patterns and relationships.
3. Allow the children to record individual progress on mastery charts as described in the *Ideas* section.
4. Use games and activities as an integral part of the facts program.
5. Do *not* necessarily require complete mastery of all facts by all students before 2-digit addition is introduced in Unit 4. (Read the introduction to Unit 4 to see how mastery cards make this practical.)

It is strongly recommended that manipulative materials be used, as suggested in Lesson 1 (Numerals to 99) and Lesson 3 (Measurement in centimetres), even with students who appear to have achieved mastery. The development of more difficult concepts of numbers and measurement requires concrete links with easier material.

# Ideas

The theme of Unit 1 is *Sports*. Throughout this unit both on the pupil pages and in the teacher's instructions, the sports theme dominates. The following activities include several ideas for creating a sports atmosphere in the classroom. Some lessons also include language arts activities requiring research on a particular sport, writing a poem about sports, or reading a book on sports. This unit theme should provide a springboard for integrating several subject areas with mathematics.

1. Hold brief recall (3-second criteria for recall) sessions daily before lunch or recess. Provide for individualized progress using a meaningful sequence of short quizzes. Allow the students to choose the appropriate quiz and to mark and record their results on an addition Fact Master card in the following way:

1st time correct — light shading

2nd time correct — dark shading

3rd time correct — sticker

+	0	1	2	3	4	5	6	7	8
0									
1					●	●	●		
2									

The students will be motivated by the representation of their individual progress. You will have a record of each child's progress. The Addition Fact Master will become an indispensable aid for the students in Units 4 and 9.

2. Provide flash cards in the shape of tennis racquets to drill addition facts to 9. Have the children sort the cards in various ways (by value of the sum, by value of the first addend, by colour of the racquets).

Use the flash cards in place of dice for any game involving a path. Have the students design such a game for use with the flash cards.

3. Organize a sports centre. Stock this area with books and stories about various sports. Let the children bring sports equipment to display and sports board games to play. As this unit progresses include addition activities and games that have the sports theme.



4. Discuss sports with the children using pictures. Determine which sports the children have played, which they have seen, and which they know nothing about. On the chalkboard keep a list of the sports you've discussed.

Investigate how adding is used in sports (points in football and basketball, personal statistics in hockey).

5. Allow the children to cut sports pictures from catalogs and magazines and to paste these on index cards. Devise sorting and language activities that use these cards, such as:

*Sorting Activities*

1. List the individual sports and the team sports.
2. List the sports you have and have not played.
3. List the sports you have and have not seen.

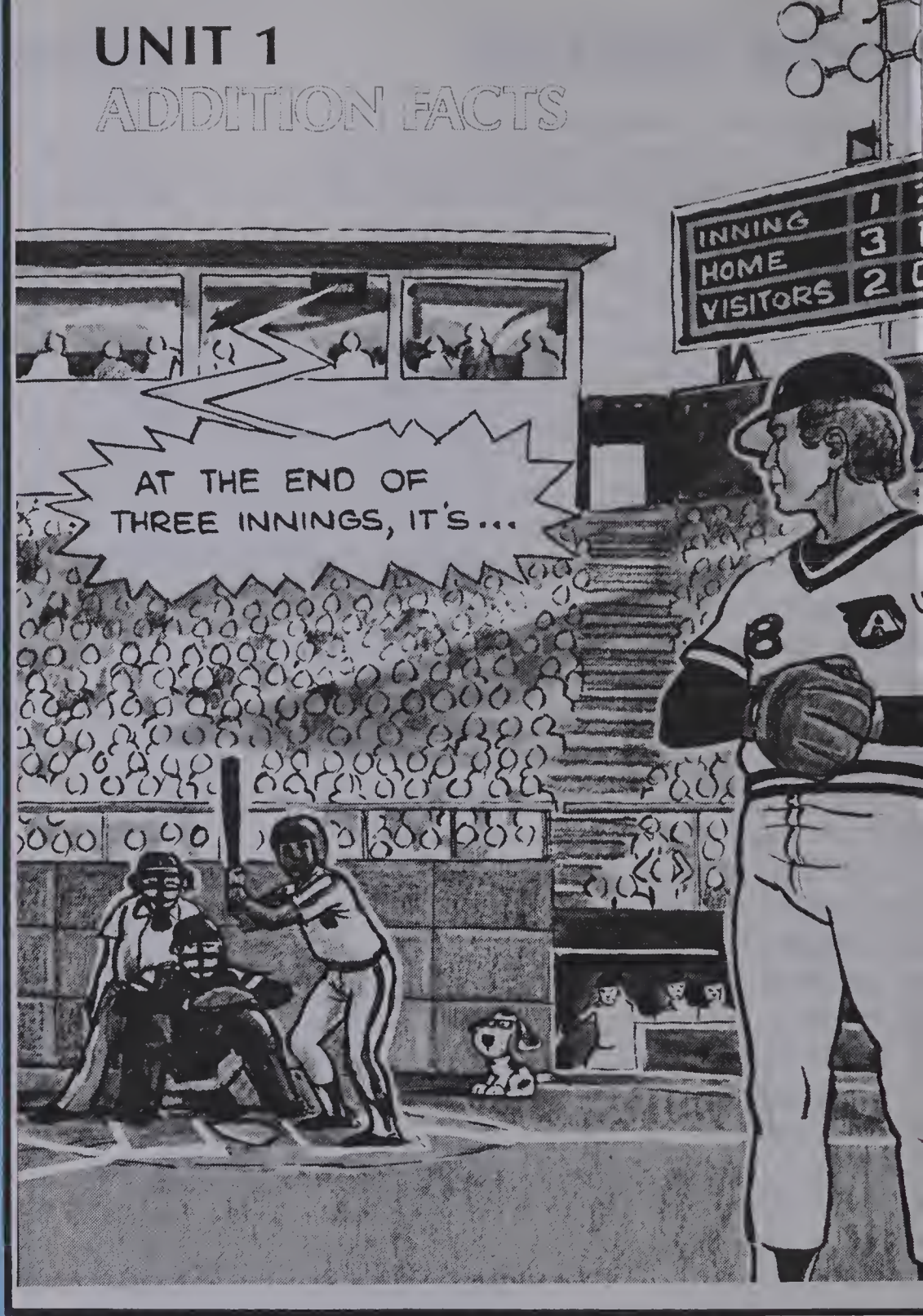
*Language Activities*

1. For each sport list the words used.
2. Write a story about your favourite sport.

Unit 1 Objective	Test Questions	Pages
N1	1-5	2-3
A1	6-10	4-5
M1	11	6-7
A2	12-16	8-9
A3	17-21	10-11
A4	22-26	12-13
M2	27	14-15
PS	28-29	

# UNIT 1

## ADDITION FACTS



Pretest

Unit 1

Add.

1. 30  
+ 5  
35

2. 60  
+ 1  
61

3. 80  
+ 4  
84

4. 2  
+ 90  
92

5. 6  
+ 50  
56

6. 3  
+ 7  
10

7. 2  
+ 9  
11

8. 7  
+ 8  
15

9. 4  
+ 6  
10

10. 9  
+ 6  
15

11. How long is the line in centimetres?  

7 cm

Add.

12. 6  
+ 6  
12

13. 9  
+ 5  
14

14. 6  
+ 7  
13

15. 4  
+ 8  
12

16. 9  
+ 4  
13



**Court A**

- $1 + 8 = 9$
- $7 + 0 = 7$
- $4 + 4 = 8$
- $2 + 2 = 4$
- $6 + 3 = 9$
- $0 + 6 = 6$
- $2 + 7 = 9$
- $4 + 4 = 8$
- $2 + 6 = 8$
- $6 + 2 = 8$
- $2 + 0 = 2$
- $6 + 1 = 7$
- $0 + 9 = 9$
- $2 + 5 = 7$
- $5 + 3 = 8$
- $5 + 1 = 6$
- $2 + 7 = 9$

**Court B**

- $3 + 6 = 9$
- $5 + 2 = 7$
- $1 + 7 = 8$
- $3 + 3 = 6$
- $4 + 0 = 4$
- $4 + 1 = 5$
- $0 + 8 = 8$
- $1 + 5 = 6$
- $3 + 5 = 8$
- $4 + 4 = 8$
- $1 + 1 = 2$
- $4 + 3 = 7$
- $2 + 7 = 9$
- $4 + 6 = 10$
- $1 + 2 = 3$
- $6 + 2 = 8$
- $2 + 4 = 6$

Check yourself! Answers in Court A are the same.

### Suggestions

Review pertinent vocabulary: add, addition, plus, altogether, in all, equals. Demonstrate the addition facts to 9 with counters. Combine sets of counters and record the related facts on the chalkboard.

Explain why it is important to memorize simple addition facts. Stress that if an addition fact is forgotten, it can be found by putting objects together and counting.

- Practise the doubles to 10 ( $1 + 1$ ,  $2 + 2$ ,  $3 + 3$ ,  $4 + 4$ ,  $5 + 5$ ). Ask the children to:
1. Give the answer from memory or by counting objects.
  2. State the fact ("one plus one equals two").
  3. Cover the question ( $1 + 1$ ) and say the fact out loud again.
  4. Form a mental picture of the fact.
  5. Write the fact ( $1 + 1 = 2$ ).

### About the Page

Discuss the different meanings of *doubles* for addition and for tennis.

Show the children how to arrange their work for page 1 on paper. Allow them to check their own answers by matching Court A with Court B.

### Reinforcement

Use flash cards for drill of the addition facts to 9.

Train the children to follow the drill sequence when they are memorizing a fact (say the fact; cover it; picture it; write it; check).

Introduce the Addition Fact Master. Begin your individualized quiz sessions (see the *Ideas* section in the Introduction to this unit) with very simple problems ( $+ 0$  and  $+ 1$ ).

- $17. \begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array}$
- $18. \begin{array}{r} 9 \\ + 8 \\ \hline 17 \end{array}$
- $19. \begin{array}{r} 7 \\ + 9 \\ \hline 16 \end{array}$
- $20. \begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array}$
- $21. \begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array}$
- $22. \begin{array}{r} 4 \\ 3 \\ + 1 \\ \hline 8 \end{array}$
- $23. \begin{array}{r} 7 \\ 2 \\ + 3 \\ \hline 12 \end{array}$
- $24. \begin{array}{r} 6 \\ 3 \\ + 4 \\ \hline 13 \end{array}$
- $25. \begin{array}{r} 3 \\ 8 \\ + 7 \\ \hline 18 \end{array}$
- $26. \begin{array}{r} 5 \\ 9 \\ + 5 \\ \hline 19 \end{array}$

27. Find the perimeter.

$4 + 2 + 5 = 11 \text{ cm}$

3 girls  
4 boys  
6 grown-ups

28. How many people?  $13$
29. How many children?  $7$

Objective N1

Read and write numerals up to 99.

Introducing the Lesson

Begin a discussion of archery. Find out if any children have had experience with the sport. Review the terms *arrow*, *quiver*, *target*, and *archery*. Read about Mary and her archery lesson. Point out that a combination of dimes and pennies would pay for the lesson. Count out ten pennies. Recall that ten pennies may be traded for a dime. Count out nine dimes. Record on the chalkboard every tenth numeral from 10 to 90.

Teaching the Lesson

Introduce 34¢ as the cost of the archery lesson. With 3 dimes and 4 pennies, explain carefully how to **count on** (first by tens and then by ones) to determine the **standard form** of the numeral. Record each step at the chalkboard.



"10, 20, 30, 31, 32, 33, 34"

Introduce a second way of looking at 34—the **tens-and-ones form**. Note that one quiver holds ten arrows, just as one dime equals 10 pennies. Explain that 34 arrows is 3 full quivers and 4 arrows left over. Show examples with other objects, then with other numbers on the chalkboard.



2 tens                      3 ones = 23

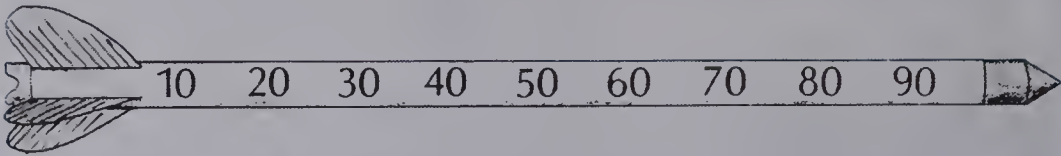
The **expanded form** of 34 as 30 + 4 can be explained with a target showing 3 arrows in the tens circle and 4 arrows in the ones circle. Three tens is 30 and four ones is 4. Point out that this can be written as 34, the *standard form* of the numeral. Say, "The numeral 34 has two places, the tens place and the ones place. The three means 3 tens or 30 and the four means 4 ones or, simply, 4."

30 + 4 =


tensones

34

Numerals to 99




Mary paid Bill 34¢ for her archery lesson.  
She started with 34 arrows.  
Today she scored 34 points.



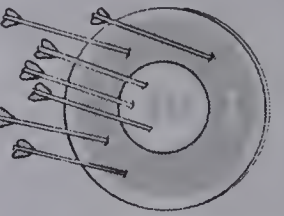
Counting on  
10,20,30,31,32,33,34

Standard form    34¢



Tens-and-ones form  
3 tens    4 ones

Standard form    34



Expanded form  
30 + 4

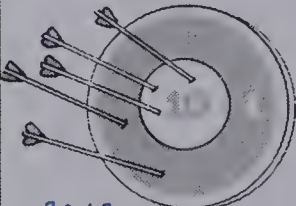
Standard form    34

EXERCISES


Write in **standard form**.

1. 30 + 2    32    2. 30 + 8    38    3. 10 + 2    12    4. 10 + 8    18
5. 3 tens 5 ones    35    6. 3 tens 7 ones    37    7. 4 tens 3 ones    43    8. 4 tens 6 ones    46


Write in **expanded form** and **standard form**.

9. 

30 + 2  
32 ■ points

10. 

20 + 4  
24 ■ cents

11. 

40 + 1  
41 ■ arrows

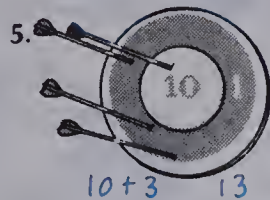
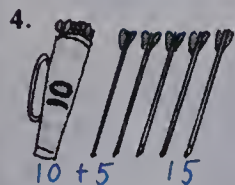
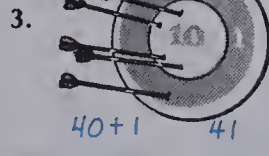
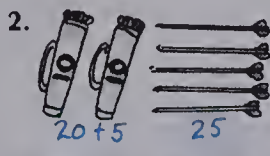
Using the Exercises

- Questions 1 to 8 ask the student to translate a numeral from expanded form or tens-and-ones form into standard form.
- Questions 9 to 11 reverse the process and have the student first write the expanded form from a model and then the standard form.



## PRACTICE

Write each in **expanded** form and **standard** form.



Write each in **standard** form.

7. 1 ten 3 ones  $13$

8. 2 tens 8 ones  $28$

9. 1 ten 0 ones  $10$

10. 0 tens 8 ones  $8$

11.  $20 + 7$   $27$

12.  $10 + 9$   $19$

13.  $90 + 2$   $92$

14.  $60 + 3$   $63$

15.  $7 + 10$   $17$

16.  $9 + 30$   $39$

17.  $4 + 60$   $64$

18.  $3 + 10$   $13$

19.  $\begin{array}{r} 10 \\ + 4 \\ \hline 14 \end{array}$

20.  $\begin{array}{r} 10 \\ + 2 \\ \hline 12 \end{array}$

21.  $\begin{array}{r} 20 \\ + 8 \\ \hline 28 \end{array}$

22.  $\begin{array}{r} 40 \\ + 1 \\ \hline 41 \end{array}$

## Hit the Apple!



I'm counting on you.

- |    |               |    |          |    |
|----|---------------|----|----------|----|
| 1. | 2.            | 3. | 4.       | 5. |
| 45 | 6 tens 4 ones | 86 | $70 + 5$ | 94 |
| 46 | 6 tens 5 ones | 87 | $70 + 6$ | 95 |
| 47 | 6 tens 6 ones | 88 |          |    |

Complete the hidden part.

52      7 tens 1 one      93       $80 + 2$       101

3

## Assigning the Practice

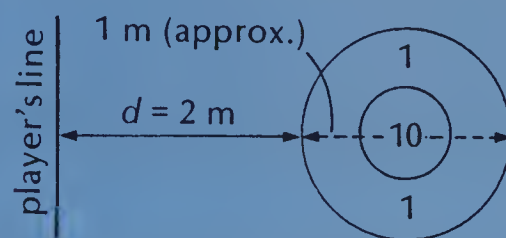
Minimum: Even numbers

Average: 1-22

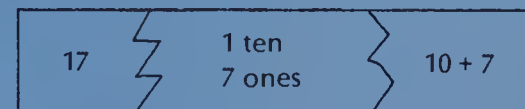
Enriched: 1-22

## Reinforcement

- Assign *Hit the Apple!* on page 3.
- Provide ten bean bags, a floor target, and a player's line as shown. Adjust distance "d" so that some skill in tossing is involved. Each student throws all ten bean bags and records the total score. The winner goes first in the next game.



- Have the students make a 3-piece jigsaw puzzle as shown below. Give each child a two-digit numeral to write in the left section. Have them write the amount of tens and ones in the middle section and the expanded form in the right section. Check their responses. Ask them to cut their puzzles into three pieces along wavy lines. Collect all the pieces and redistribute them by category: left, middle, and right segments for the children to reassemble.



## Enrichment

- Make a  $6 \times 6$  grid on an overhead transparency. In half of the squares write numerals in expanded form. In the other half write the same numerals in standard form. Cut construction paper squares and fit them on top of each grid square. Now divide the class into two teams and play *Concentration*. A player from the first team chooses two squares to be uncovered. If they show expressions of the same numeral, the team claims the slips of paper and scores 2 points. If the expressions are of different numerals, the slips are replaced and a player from the second team repeats the process. The team with the highest score is the winner.
- Organize a library research project on archery.

## Extra Practice

## Worksheet N1

Pages 2-3

Write in standard form.

1.  $10 + 6 =$   $16$

2.  $10 + 8 =$   $18$

3.  $20 + 7 =$   $27$

4.  $20 + 2 =$   $22$

5.  $80 + 3 =$   $83$

6.  $90 + 6 =$   $96$

Count on and write how much money.

7. =  $72$  ¢

8. =  $18$  ¢

Write each numeral in expanded form.

9.  $36 =$   $30 + 6$

10.  $19 =$   $10 + 9$

11.  $52 =$   $50 + 2$

12.  $17 =$   $10 + 7$

13.  $23 =$   $20 + 3$

14.  $32 =$   $30 + 2$



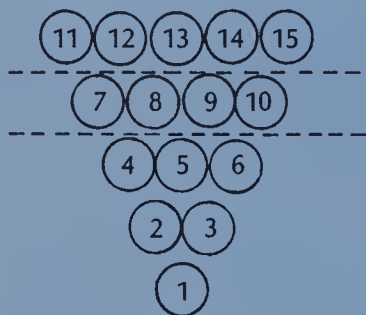
### Objective A1

Add numbers with sums to 10, 11, and 15.

### Introducing the Lesson

Initiate a discussion on bowling to familiarize the students with the terms *strike*, *spare*, *pins*, and *10-pin*. Allow some time for the children to relate their bowling experiences.

Place the discs on the overhead transparency and display the 10-pin triangular shape that is used in bowling. Then show how the 15-pin triangular shape can be made from the 10-pin triangle.



From page 4 have a student read aloud about the 10-pin and 15-pin bowling games.

### Teaching the Lesson

Using ten bowling pins (pop bottles) show all the combinations of pins knocked down and pins standing that could happen in a game and record the addition facts for 10 on the chalkboard. Be certain to identify **addition twins** ( $4 + 6$  and  $6 + 4$ ).

Pins Standing	Pins Down	Addition Fact
0	10 (Strike)	$0 + 10$
1	9	$1 + 9$
4	6	$4 + 6$
6	4	$6 + 4$

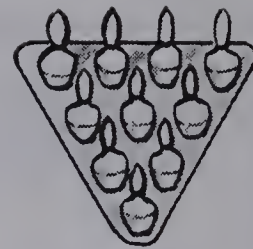
} twins

Repeat a similar procedure with fifteen bowling pins to determine and record the **addition facts for 15**.

Point out that 11 pins cannot be shaped into a triangular shape for bowling. Take eleven discs and separate them into two parts to demonstrate the eight addition facts for 11.

Before assigning the exercises, review the 10, 11, and 15 facts with flash cards.

## Sums to 10, 11, and 15



Linda likes to bowl 10 pins.  
Frank and Mascot made up a game with 15 pins.



With 2 throws Frank and Linda knock down all their pins.  
Poor Mascot gets 11 pins and a sore head.

Linda

$$\begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array}$$

Frank

$$\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array}$$

Mascot

$$\begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$$



### EXERCISES

Add these bowling scores.

- |   |   |   |   |  |
|---|---|---|---|--|
| 1. $\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$ | 2. $\begin{array}{r} 7 \\ + 3 \\ \hline 10 \end{array}$ | 3. $\begin{array}{r} 2 \\ + 8 \\ \hline 10 \end{array}$ | 4. $\begin{array}{r} 9 \\ + 1 \\ \hline 10 \end{array}$ | 5. $\begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$  |
| 6. $\begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array}$ | 7. $\begin{array}{r} 9 \\ + 6 \\ \hline 15 \end{array}$ | 8. $\begin{array}{r} 8 \\ + 3 \\ \hline 11 \end{array}$ | 9. $\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$ | 10. $\begin{array}{r} 2 \\ + 9 \\ \hline 11 \end{array}$ |

4

### Using the Exercises

- Questions 1 to 5 include addition facts with the sum of 10.
- Questions 6 to 10 include facts to 15 and 11.

## PRACTICE

Copy and add these.

Place a triangle  $\nabla$  around your sums of 10.

1. $\begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array}$	2. $\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array}$	3. $\begin{array}{r} 9 \\ + 2 \\ \hline 11 \end{array}$	4. $\begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$	5. $\begin{array}{r} 4 \\ + 7 \\ \hline 11 \end{array}$	6. $\begin{array}{r} 9 \\ + 1 \\ \hline 10 \end{array}$
7. $\begin{array}{r} 5 \\ + 6 \\ \hline 11 \end{array}$	8. $\begin{array}{r} 3 \\ + 8 \\ \hline 11 \end{array}$	9. $\begin{array}{r} 1 \\ + 9 \\ \hline 10 \end{array}$	10. $\begin{array}{r} 2 \\ + 9 \\ \hline 11 \end{array}$	11. $\begin{array}{r} 2 \\ + 8 \\ \hline 10 \end{array}$	12. $\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$
13. $\begin{array}{r} 3 \\ + 7 \\ \hline 10 \end{array}$	14. $\begin{array}{r} 8 \\ + 2 \\ \hline 10 \end{array}$	15. $\begin{array}{r} 8 \\ + 3 \\ \hline 11 \end{array}$	16. $\begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array}$	17. $\begin{array}{r} 6 \\ + 9 \\ \hline 15 \end{array}$	18. $\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$

19.  $9 + 6 = 15$     20.  $7 + 3 = 10$     21.  $6 + 5 = 11$     22.  $5 + 6 = 11$

23. Mascot got 7 pins with his first throw.

On his second throw, he knocked down 4 pins.

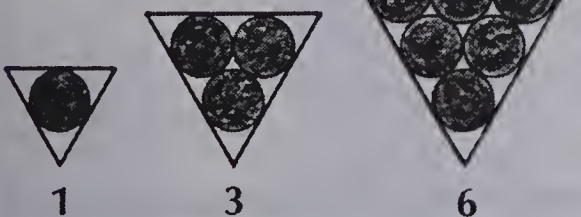
How many pins did he get down in all? *11 pins*

Copy and complete.

24.  $7 + \square = 10$     25.  $2 + \square = 10$     26.  $6 + \square = 10$     27.  $1 + \square = 10$

## Triangle Numbers

Use pennies or checkers to find all the triangle numbers less than 100.



Don't stop.  
Keep going!



*10, 15, 21, 28, 36, 45, 55, 66, 78, 91*

5

## Assigning the Practice

Minimum: Even numbers

Average: 1-27

Enriched: 1-27

## Reinforcement

1. Give each student 15 counters and ask him or her to divide them into two groups to show addition problems for 15 in all possible ways. Ask them to record their answers on paper.

15	
$\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet$	$6 + 9$
$\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet$	$5 + 10$

2. Have the students connect numbers that add to 10.



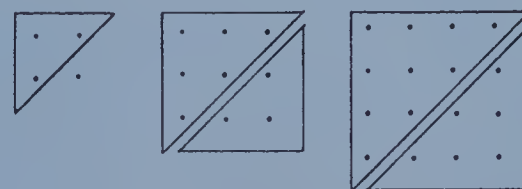
3. Construct two jigsaw puzzles. Write sums of the triangle numbers (10 and 15) on each piece. Mix the puzzles together. Direct the students to put them back together.



## Enrichment

1. Assign *Triangle Numbers*, page 5.

2. To extend the concept of triangle numbers, investigate square numbers with the children. Note that each square number is the sum of two triangle numbers. Determine the square numbers up to 100 indirectly (adding) and directly (building).



3. Introduce a bowling game in physical education using two rubber balls and ten pins. Provide a score sheet which requires addition after two rolls of the ball.

4. Ask the students to write a poem, illustrated with pictures, about a real or imagined bowling experience.

## Extra Practice

## Worksheet A1

Pages 4-5

dd.

$\begin{array}{r} 8 \\ + 2 \\ \hline 10 \end{array}$	2. $\begin{array}{r} 8 \\ + 3 \\ \hline 11 \end{array}$	3. $\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array}$	4. $\begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$	5. $\begin{array}{r} 6 \\ + 9 \\ \hline 15 \end{array}$
$\begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array}$	7. $\begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array}$	8. $\begin{array}{r} 7 \\ + 4 \\ \hline 11 \end{array}$	9. $\begin{array}{r} 7 \\ + 3 \\ \hline 10 \end{array}$	10. $\begin{array}{r} 9 \\ + 6 \\ \hline 15 \end{array}$

complete.

1.  $2 + \underline{8} = 10$     12.  $3 + \underline{7} = 10$     13.  $4 + \underline{6} = 10$

14.  $5 + \underline{5} = 10$     15.  $6 + \underline{4} = 10$     16.  $1 + \underline{9} = 10$



**Objective M1**

Estimate and measure length in centimetres.

**Introducing the Lesson**

Measure the height of a chalkboard with new pencils taped end to end. Explain that a *unit of length* is used end to end to measure things. A pencil, an eraser, a paper clip, the fixed length of anything can serve as a unit of length.

Ask the children to measure other classroom objects in terms of non-standard units. Record their results on the chalkboard.

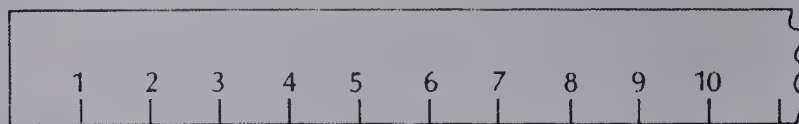
Math book—6 paper clips wide.

**Teaching the Lesson**

Show a pen to be measured by the standard unit—*centimetre*. Place a centimetre square strip beside the pen and ask the children to determine by counting how many centimetres long it is.

Show another object to be measured in centimetres, but first ask the children to **estimate** (make a smart guess about) its length. Explain that it will be measured to the **nearest centimetre**. Use the centimetre strip to find its length and then write the length properly labeled. Continue in like manner with several more objects using alternately a centimetre ruler and a strip of centimetre squares.

Ask the children to take partners. Give each pair a centimetre ruler, a strip of centimetre squares, and a piece of paper. Write the words **estimate** and **measure** on the chalkboard. Ask the children to make these two headings on their papers. List small objects such as *book, pencil, and crayon* for which each pair will estimate the lengths. Afterward let everyone determine the actual measurements in centimetres.

**Centimetre**

The arrow is **eight centimetres** long.  
You write **8 cm**.

What if you don't have a ruler?

You can estimate the length.

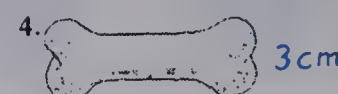
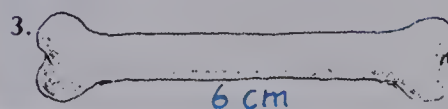
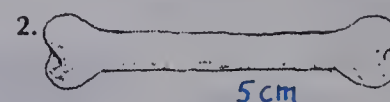
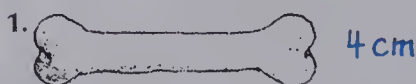
An **estimate** is a careful guess.



I estimate the bone to be 4 or 5 bites, I mean, centimetres.

**EXERCISES**

Estimate the length in centimetres. Then measure.



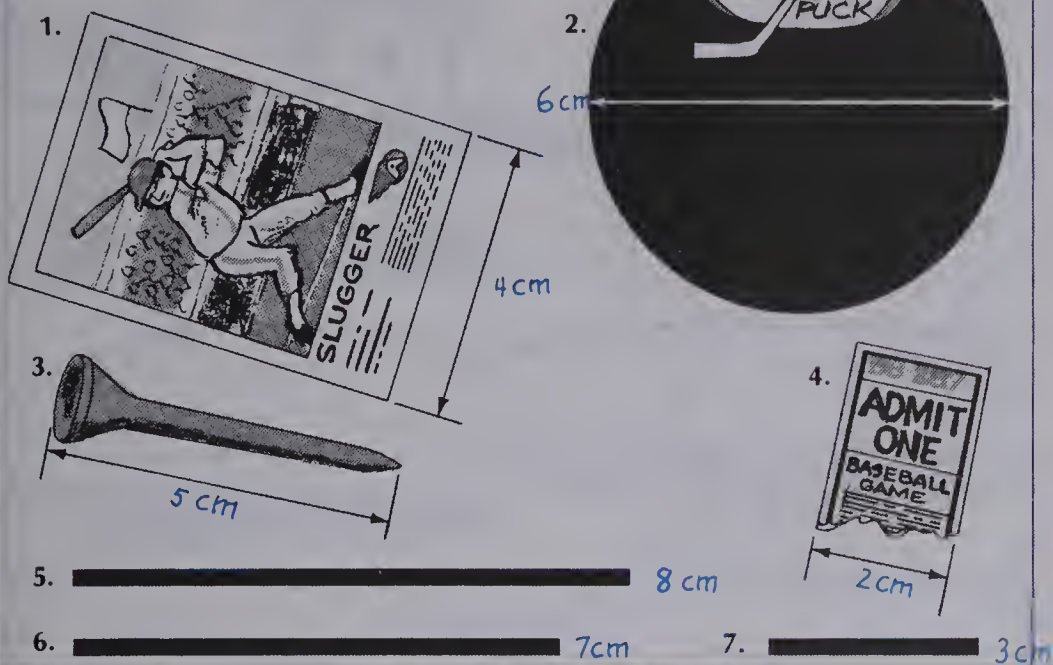
6

**Using the Exercises**

- Questions 1 to 4 continue the estimating and measuring activities. The bones are to be measured to the nearest centimetre.

## PRACTICE

First **estimate** the lengths in centimetres.  
Then measure.

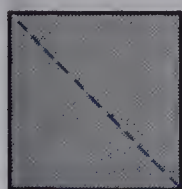


## Triangle Trickery

Trace this triangle 14 times.

Cut out the 14 triangles.

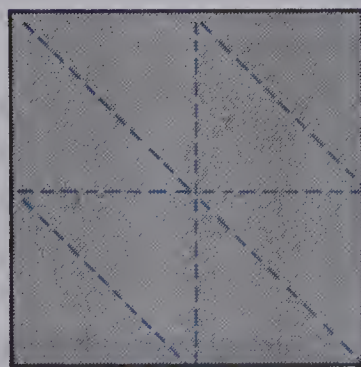
Fit the triangles to cover these squares.



2 triangles



4 triangles



8 triangles

7

## Extra Practice

## Worksheet M1

Pages 6-7

### Myself

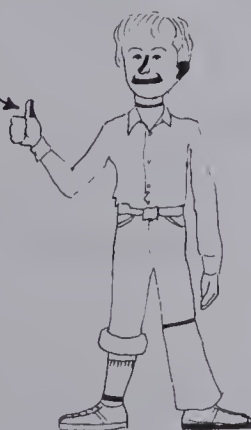
Work with a friend. Match the body parts.

thumb: \_\_\_\_ cm

nose: \_\_\_\_ cm

neck: \_\_\_\_ cm

ankle: \_\_\_\_ cm



smile: \_\_\_\_ cm

knee: \_\_\_\_ cm

foot: \_\_\_\_ cm

ear: \_\_\_\_ cm

Answers will vary.

## Assigning the Practice

Minimum: All

Average: All

Enriched: All

## Reinforcement

1. Demonstrate the use of calipers for measuring solid objects. The calipers are first placed to span the "widest part" of the object and then placed alongside a centimetre ruler. Set up eight stations around the classroom, one for each of the sports objects listed below. Supply half the stations with erasers and strips of centimetre squares and the other half with paper clips and centimetre rulers. Stations 2, 3, and 6 require calipers. Pass out the following worksheets and ask the students to record all findings.

	erasers	clips	cm
1. baton			
2. football			
3. softball			
4. frisbee			
5. hockey puck			
6. soccer ball			
7. baseball bat			
8. tennis racquet			

2. Prepare a collection of objects for estimating length. Place tags (face down) under each object. On each tag print various ranges with encouraging comments.

10-12 cm or 20-22 cm—Keep trying.  
13-15 cm or 17-19 cm—Not bad.  
16 cm Right! Amazing!

## Enrichment

1. Assign *Triangle Trickery*, page 7.

2. To prepare to play a game involving measurement and estimation, discuss these terms: *length, long, breadth, width, wide, thickness, depth, height*. The game begins as a leader spies an object which all players can see and estimates one of its dimensions saying, "It's approximately 29 cm wide." The rest of the children guess what the object is. The student who guesses correctly measures the object and tells the exact measurement. This student then becomes the leader.



# UNIT 1 LESSON 4

## Objective A2

Add numbers with sums to 12, 13, and 14.

## Introducing the Lesson

Point out the hurdler's jumps on page 8 and Mascot's comment that  $8 + 6 = 14$ . Review the concept of equation and the *balancing* meaning of the equal sign. Recall that additions can be written *vertically* as well as *horizontally*.

## Teaching the Lesson

Demonstrate and relate the three models for adding shown on page 8.

- Form several addition models with sums to 12, 13, and 14 using the coloured centimetre strips. Have the children record the addition facts horizontally and vertically on the chalkboard.
- Draw an enlarged "centimetre" strip ruler on the chalkboard and make several addition models of two arrow jumps for sums of 12, 13, and 14. Have the children record facts both in horizontal and in vertical form.
- Display an enlarged paper "centimetre" strip ruler to 15. Make an *addition machine* by fitting another ruler underneath the first as shown on page 8. Explain how this shows  $8 + 7 = 15$ .

Display several small addition tables on the chalkboard. Explain how the tables work. Ask the children for the missing answers.

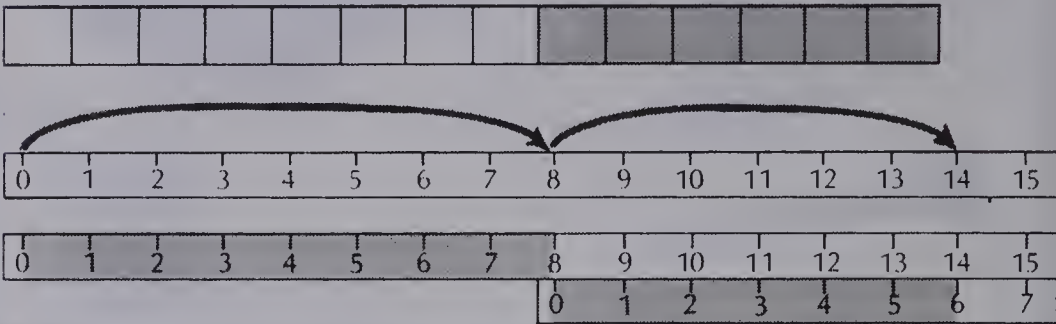
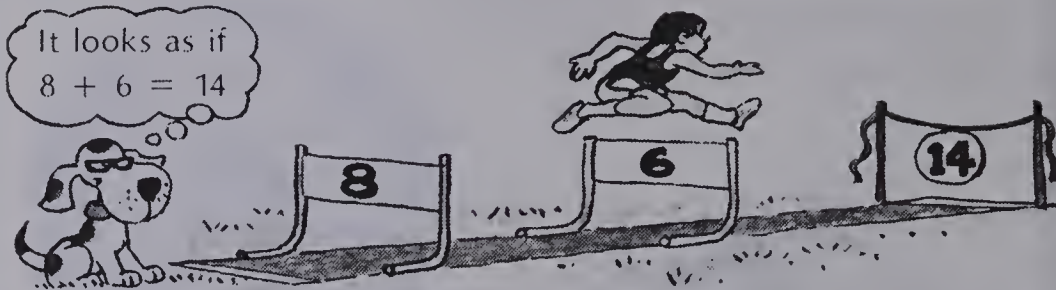
+	9	8	6
5			

+	3	5	6
9			

+	8	9	7
6			

- Discuss real-life situations involving sums to 12, 13, and 14. Examples:
- Jane has 8 marbles and won 5 more from Jack. How many marbles does she have now?
  - Bill had 6 pairs of socks. He got 8 more pairs for his birthday. How many pairs does he have now?

# Sums to 12, 13, and 14



## EXERCISES

Write the addition facts for these.

1.  $8 + 4 = 12$

3.  $6 + 8 = 14$

2.  $8 + 5 = 13$

4.  $8 + 5 = 13$

Add.

5.	3	6.	4	7.	5	8.	6	9.	7
	+ 9		+ 8		+ 9		+ 6		+ 5
	<u>12</u>		<u>12</u>		<u>14</u>		<u>12</u>		<u>12</u>

10.	5	11.	6	12.	7	13.	8	14.	9
	+ 8		+ 7		+ 6		+ 5		+ 4
	<u>13</u>		<u>13</u>		<u>13</u>		<u>13</u>		<u>13</u>

8

## Using the Exercises

- Questions 1 and 2 give a number line from which the addition fact must be written.
- Questions 3 and 4 use the *addition machine* model.
- Questions 5 to 14 are sums to 12, 13, or 14.

## PRACTICE

Add. Use centimetre squares or rulers to help.

1.  $\begin{array}{r} 5 \\ + 8 \\ \hline 13 \end{array}$
2.  $\begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array}$
3.  $\begin{array}{r} 4 \\ + 8 \\ \hline 12 \end{array}$
4.  $\begin{array}{r} 5 \\ + 7 \\ \hline 12 \end{array}$
5.  $\begin{array}{r} 6 \\ + 8 \\ \hline 14 \end{array}$
6.  $\begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array}$
7.  $\begin{array}{r} 8 \\ + 6 \\ \hline 14 \end{array}$
8.  $\begin{array}{r} 8 \\ + 4 \\ \hline 12 \end{array}$
9.  $\begin{array}{r} 8 \\ + 5 \\ \hline 13 \end{array}$
10.  $\begin{array}{r} 7 \\ + 5 \\ \hline 12 \end{array}$
11.  $\begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array}$
12.  $\begin{array}{r} 7 \\ + 6 \\ \hline 13 \end{array}$
13.  $\begin{array}{r} 9 \\ + 3 \\ \hline 12 \end{array}$
14.  $\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array}$
15.  $\begin{array}{r} 9 \\ + 5 \\ \hline 14 \end{array}$
16.  $\begin{array}{r} 9 \\ + 4 \\ \hline 13 \end{array}$
17.  $\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$
18.  $\begin{array}{r} 3 \\ + 9 \\ \hline 12 \end{array}$

Copy and complete these tables.

19.

+	2	5	4	6	3	7
7	9	12	11	13	10	14

20.

+	2	5	3	4	6
8	10	13	11	12	14

## REVIEW

Write in standard form.

Add.

1. 5 tens 4 ones  $\underline{54}$       2.  $40 + 8$   $\underline{48}$       3.  $\begin{array}{r} 10 \\ + 6 \\ \hline 16 \end{array}$       4.  $\begin{array}{r} 60 \\ + 7 \\ \hline 67 \end{array}$

Add.

5.  $\begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$       6.  $\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array}$       7.  $\begin{array}{r} 8 \\ + 3 \\ \hline 11 \end{array}$       8.  $\begin{array}{r} 4 \\ + 7 \\ \hline 11 \end{array}$       9.  $\begin{array}{r} 9 \\ + 6 \\ \hline 15 \end{array}$

Add.

10.  $\begin{array}{r} 8 \\ + 4 \\ \hline 12 \end{array}$       11.  $\begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array}$       12.  $\begin{array}{r} 4 \\ + 9 \\ \hline 13 \end{array}$       13.  $\begin{array}{r} 6 \\ + 8 \\ \hline 14 \end{array}$       14.  $\begin{array}{r} 5 \\ + 9 \\ \hline 14 \end{array}$

9

## Assigning the Practice

Minimum: Odd numbers

Average: All

Enriched: All

## Review Exercises

Questions	Objective	Pages
1-4	N1	2-3
5-9	A1	4-5
10-14	A2	8-9

## Reinforcement

- Provide the children with 12 counters to divide into two groups in as many ways as they can. Record all the *addition names* they found for 12. Do the same with names for 13 and 14.

$$\begin{array}{r} 12 \\ 9 + 3 \\ 6 + 6 \\ 5 + 7 \end{array} \quad \begin{array}{r} 13 \\ 7 + 6 \\ 5 + 8 \\ 9 + 4 \end{array} \quad \begin{array}{r} 14 \\ 7 + 7 \\ 5 + 9 \\ 6 + 8 \end{array}$$

- Prepare jigsaws for equation practice.

$$\boxed{3 + 2} \quad \boxed{=} \quad \boxed{4 + 1}$$

Mix them up and have the children put them together again.

- Tape a paper number line on each desk to be used with centimetre rulers as part of an *adding machine*.

## Enrichment

- Investigate the relationship between the addition and subtraction facts by writing all possible addition equations with sums to 12, 13, and 14. Then write a related subtraction fact for each.

$$\begin{array}{r} 12 \\ 3 + 9 = 12 \\ 7 + 5 = 12 \\ 6 + 6 = 12 \end{array} \quad \begin{array}{r} 12 \\ 12 - 9 = 3 \\ 12 - 5 = 7 \\ 12 - 6 = 6 \end{array}$$

Egg cartons and counters can be used to illustrate this.

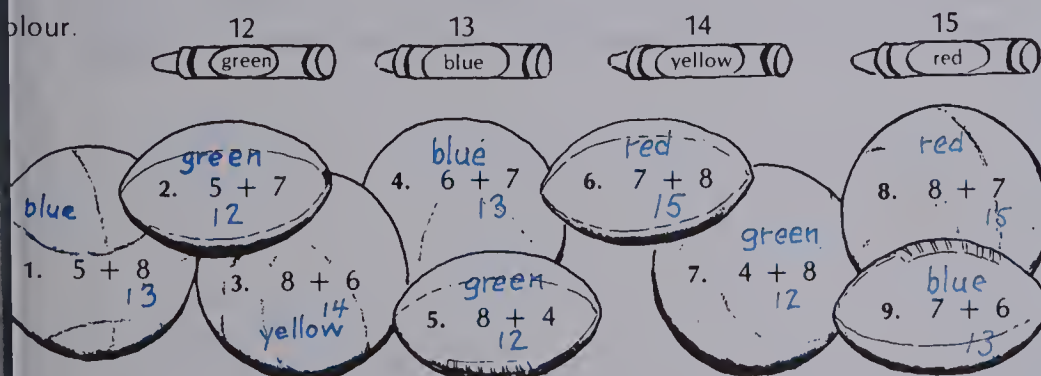
- On the chalkboard write several addition problems with 3 addends and assign a problem number to each. Write these problem numbers also on small slips of paper and put them in a "hat". Using a large number line (to 15) on the floor, have the students take turns drawing a problem to *hop* (to the first addend), *skip* (to the second addend), and *jump* (to the third addend) on the number line.

## Extra Practice

## Worksheet A2

Pages 8-9

colour.



complete.

- 5 + 8 = 13      11. 7 + 7 = 14      12. 6 + 6 = 12
- 5 + 9 = 14      14. 9 + 3 = 12      15. 7 + 6 = 13



## Objective A3

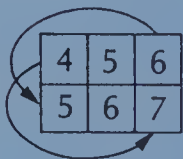
Add numbers with sums to 16, 17, and 18.

## Introducing the Lesson

Direct the students to look at the addition table at the bottom of page 11 while a large one is shown on the overhead projector, chalkboard, or poster. Review how to use the table by the method described on page 11. Practise using sums to 10, 11, 12, 13, 14, and 15.

Discover the following patterns on the addition table and discuss them with the children.

- Going down any column or right along any row, we count by ones.
- Moving diagonally we encounter addition families (for example, all the sums of 14) or we count by twos (5, 7, 9, 11, 13, 15).
- Folding along one main diagonal (top left to lower right), we discover that the table is symmetrical since addition is commutative ( $2 + 3 = 3 + 2$ ).
- For any rectangle within the table, we discover that the sums of the opposite corners are equal.



$$\begin{array}{ll} 4 + 7 = 11 & 5 + 7 = 12 \\ 6 + 5 = 11 & 6 + 6 = 12 \end{array}$$

## Teaching the Lesson

Using discs on the overhead projector, introduce the easy way to add 9. "Nine plus seven is the same as ten plus six."



Show several other examples of adding nine the easy way on the overhead projector. Find all the facts with nine as an addend on the addition chart.

Build patterns of even numbers using discs on an overhead projector. Investigate the ones place pattern. Note that the sum of any doubled number is always even. Count out loud by twos to 20.

Practise the addition facts with sums to 16, 17, and 18 with flash cards.

# Sums to 16, 17, and 18

$$\begin{array}{r} 9 \\ + 3 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ + 2 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 9 \\ + 3 \\ \hline 12 \end{array}$$



To add 9, you may add 10 and take away 1.

$$3 + 9 = 12$$
$$2 + 10 = 12$$

## Even Numbers

0	2	4	6	8
---	---	---	---	---

Doubling is adding a number to itself.

0	1	2	3	4
+ 0	+ 1	+ 2	+ 3	+ 4
0	2	4	6	8

..., 10, 12, 14, 16, 18  
Can you spot the patterns?



## EXERCISES

Complete the addition facts.

1. $\begin{array}{r} 9 \\ + 7 \\ \hline 1 \square \\ 6 \end{array}$	2. $\begin{array}{r} 9 \\ + 8 \\ \hline \square 7 \\ 1 \end{array}$	3. $\begin{array}{r} 9 \\ + 6 \\ \hline \square \square \\ 1 \ 5 \end{array}$	4. $\begin{array}{r} 3 \\ + 9 \\ \hline 1 \square \\ 2 \end{array}$	5. $\begin{array}{r} 4 \\ + 9 \\ \hline \square 3 \\ 1 \end{array}$	6. $\begin{array}{r} 5 \\ + 9 \\ \hline \square \square \\ 1 \ 4 \end{array}$
---	---	---	---	---	---

Write addition facts for these.

7. $\begin{array}{c} \bullet \bullet \bullet \\ \bullet \bullet \bullet \\ 4 + 4 = 8 \end{array}$	8. $\begin{array}{c} \bullet \bullet \\ \bullet \bullet \bullet \\ 5 + 5 = 10 \end{array}$	9. $\begin{array}{c} \bullet \bullet \bullet \\ \bullet \bullet \bullet \\ 6 + 6 = 12 \end{array}$	10. $\begin{array}{c} \bullet \bullet \bullet \\ \bullet \bullet \bullet \\ 7 + 7 = 14 \end{array}$	11. $\begin{array}{c} \bullet \bullet \bullet \\ \bullet \bullet \bullet \\ 8 + 8 = 16 \end{array}$	12. $\begin{array}{c} \bullet \bullet \bullet \\ \bullet \bullet \bullet \\ 9 + 9 = 18 \end{array}$
---	--	--	---	---	---

## Using the Exercises

- Questions 1 to 6 give practice with the easy way of adding nine.
- Questions 7 to 12 include the addition facts formed by doubles with sums to 18. The addition facts are written from a model.



## PRACTICE

Add.

1.  $\begin{array}{r} 3 \\ + 9 \\ \hline 12 \end{array}$
2.  $\begin{array}{r} 5 \\ + 9 \\ \hline 14 \end{array}$
3.  $\begin{array}{r} 8 \\ + 9 \\ \hline 17 \end{array}$
4.  $\begin{array}{r} 9 \\ + 7 \\ \hline 16 \end{array}$
5.  $\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array}$
6.  $\begin{array}{r} 9 \\ + 4 \\ \hline 13 \end{array}$
7.  $\begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array}$
8.  $\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$
9.  $\begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array}$
10.  $\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array}$
11.  $\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$
12.  $\begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array}$

8 hockey sticks  
8 hockey cards  
9 baseball cards

7 soccer balls  
9 footballs  
7 soccer shoes

13. How many cards? 17
14. How many things for hockey? 16
15. How many balls? 16
16. How many things for soccer? 14

## Addition Table

$$3 + 7 = 10$$

Put a finger beside the 3.  
Slide it straight across.  
Stop below the 7 at the top.  
The answer is 10.

$$3 + 7 = 10$$

1. Find these using the table.

$$2 + 3 = 5 \quad 6 + 5 = 11$$

$$7 + 7 = 14 \quad 9 + 7 = 16$$

2. Find  $9 + 6$  and  $6 + 9$ . 15

Are your slides the same? no

Are the answers the same? yes

+	0	1	2	3	4	5	6	7	8	9
0	0	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9	10
2	2	3	4	5	6	7	8	9	10	11
3	3	4	5	6	7	8	9	10	11	12
4	4	5	6	7	8	9	10	11	12	13
5	5	6	7	8	9	10	11	12	13	14
6	6	7	8	9	10	11	12	13	14	15
7	7	8	9	10	11	12	13	14	15	16
8	8	9	10	11	12	13	14	15	16	17
9	9	10	11	12	13	14	15	16	17	18

11

## Assigning the Practice

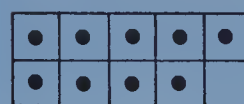
Minimum: 1-12

Average: 1-16

Enriched: 1-16

## Reinforcement

1. Assign *Addition Table*, page 11.
2. Have the students form a set of 16 using counters (beans). Separate the 16 counters into two subsets in as many ways as possible.
3. Provide cardboard 10-frames and counters for students requiring materials for +9 problems.

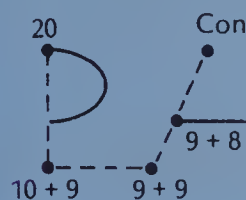


models

$$9 + 2 = 10 + 1 = 11$$

4. Have the children determine a strategy for changing *add 8* addition facts to *add-10-subtract-2* facts by grouping materials.

5. Make up dot-to-dot patterns and distribute them to the students. For example, have students start by connecting the dot with a sum equal to 20, with the dot with a sum equal to 19, and so on down to 10. Then work back up to a sum of 20 to complete the pattern.



## Enrichment

1. Investigate with the children whether or not Mascot's strategy can be changed to "take away one then add ten". Discuss, using materials, the following:

To find:  $3 + 9$

Think:  $(3 - 1) + 10$

$$2 + 10 = 12$$

2. Ask the children to list on paper a counting by twos from 2 to 50 (or further if possible). Then have them write the addition double that has each listed multiple as a sum.

$$2 = 1 + 1$$

$$4 = 2 + 2$$

$$6 = 3 + 3$$

etc.

## Extra Practice

## Worksheet A3

Pages 10-11

Add.

1.  $6 + 9 = 15$
2.  $9 + 8 = 17$
3.  $8 + 8 = 16$
4.  $8 + 9 = 17$
5.  $9 + 9 = 18$
6.  $7 + 9 = 16$
7.  $9 + 7 = 16$
8.  $9 + 10 = 19$
9.  $10 + 8 = 18$

Put the same number in both spaces.

$$5 + 5 = 10 \quad 11. 4 + 4 = 8 \quad 12. 6 + 6 = 12$$

$$9 + 9 = 18 \quad 14. 7 + 7 = 14 \quad 15. 8 + 8 = 16$$

## Objective A4

Add three one-digit numbers.

## Introducing the Lesson

With the hockey illustration shown on page 12 begin a discussion about hockey. Recall the terms *goal*, *puck*, *period*, *stick*, etc., and have the children relate some of their hockey experiences. Direct the discussion to the method of scoring hockey as shown on page 12. The total number of goals scored in each of the three periods is given and to find the final score *one must add*.

## Teaching the Lesson

Make a hockey scoreboard on the chalkboard or on a felt board similar to the one shown on page 12.

Explain that the total score for this team can be found by adding all three addends, starting from the left:

$$\begin{array}{r} 5 + 4 + 3 = 12 \\ \quad \quad \quad 9 \end{array}$$

One can start from the right:

$$\begin{array}{r} 5 + 4 + 3 = 12 \\ \quad \quad \quad 7 \end{array}$$

One can also start from the ends:

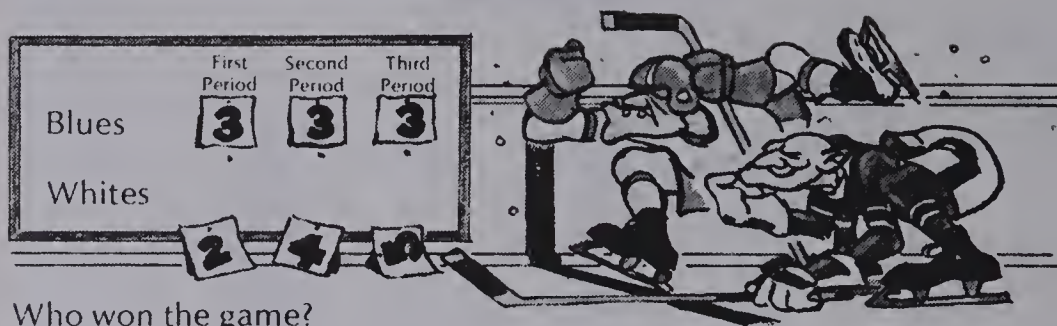
$$\begin{array}{r} 5 + 4 + 3 = 12 \\ \quad \quad \quad 8 \end{array}$$

Practise several other examples in this horizontal format and then show how these same strategies can also apply to vertical examples. Use as many examples as needed.

Recall the facts combining 10 with any one-digit number ( $10 + 3$ ). Explain how adding three numbers may be simplified if one *looks for a 10* to add first. Show several examples in both the vertical and horizontal formats.

$$\begin{array}{r} 7 \\ 5 \\ 3 \\ \hline 15 \end{array} \quad \begin{array}{r} 7 \\ 2 \\ 8 \\ \hline 17 \end{array} \quad \begin{array}{r} 5 + 6 + 5 = 16 \\ \quad \quad \quad 10 \end{array} \quad \begin{array}{r} 3 + 1 + 9 = 13 \\ \quad \quad \quad 10 \end{array}$$

# Three Addends



Who won the game?

Start at the top.

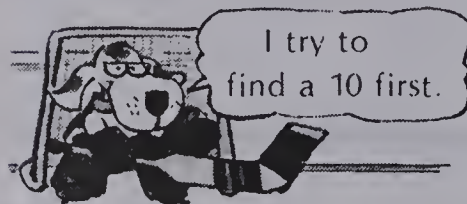
$$\begin{array}{r} 2 \\ 4 \\ + 5 \\ \hline 11 \end{array}$$

Start at the bottom.

$$\begin{array}{r} 2 \\ 4 \\ + 5 \\ \hline 11 \end{array}$$

Start at the ends.

$$\begin{array}{r} 2 \\ 4 \\ + 5 \\ \hline 11 \end{array}$$



$$\begin{array}{r} 6 \\ 3 \\ + 4 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 2 \\ 9 \\ + 1 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 3 \\ 7 \\ + 8 \\ \hline 18 \end{array}$$

## EXERCISES

Add.

1. $\begin{array}{r} 2 \\ 2 \\ + 3 \\ \hline 7 \end{array}$	2. $\begin{array}{r} 3 \\ 4 \\ + 3 \\ \hline 10 \end{array}$	3. $\begin{array}{r} 6 \\ 2 \\ + 1 \\ \hline 9 \end{array}$	4. $\begin{array}{r} 7 \\ 1 \\ + 2 \\ \hline 10 \end{array}$	5. $\begin{array}{r} 4 \\ 2 \\ + 4 \\ \hline 10 \end{array}$	6. $\begin{array}{r} 5 \\ 2 \\ + 5 \\ \hline 12 \end{array}$
---	--	---	--	--	--

Look for a 10. Then add.

7. $\begin{array}{r} 7 \\ 6 \\ + 3 \\ \hline 16 \end{array}$	8. $\begin{array}{r} 9 \\ 5 \\ + 1 \\ \hline 15 \end{array}$	9. $\begin{array}{r} 1 \\ 8 \\ + 2 \\ \hline 11 \end{array}$	10. $\begin{array}{r} 2 \\ 6 \\ + 4 \\ \hline 12 \end{array}$	11. $\begin{array}{r} 5 \\ 5 \\ + 2 \\ \hline 12 \end{array}$	12. $\begin{array}{r} 7 \\ 3 \\ + 4 \\ \hline 14 \end{array}$
--	--	--	---	---	---

## Using the Exercises

- Questions 1 to 6 include three addends. The students may use whichever format feels best.
- Questions 7 to 12 ask them to look first for the ten sum and then add the remaining addend.

At this stage encourage the children to show their partial sums.



## PRACTICE

First find a 10. Then add.

1. $\begin{array}{r} 9 \\ 3 \\ + 1 \\ \hline 13 \end{array}$	2. $\begin{array}{r} 6 \\ 4 \\ + 3 \\ \hline 13 \end{array}$	3. $\begin{array}{r} 2 \\ 7 \\ + 3 \\ \hline 12 \end{array}$	4. $\begin{array}{r} 8 \\ 4 \\ + 2 \\ \hline 14 \end{array}$	5. $\begin{array}{r} 9 \\ 1 \\ + 9 \\ \hline 19 \end{array}$	6. $\begin{array}{r} 5 \\ 5 \\ + 5 \\ \hline 15 \end{array}$
--	--	--	--	--	--

Add.

7. $\begin{array}{r} 2 \\ 3 \\ + 2 \\ \hline 7 \end{array}$	8. $\begin{array}{r} 6 \\ 2 \\ + 7 \\ \hline 15 \end{array}$	9. $\begin{array}{r} 3 \\ 4 \\ + 3 \\ \hline 10 \end{array}$	10. $\begin{array}{r} 4 \\ 6 \\ + 3 \\ \hline 13 \end{array}$	11. $\begin{array}{r} 3 \\ 2 \\ + 3 \\ \hline 8 \end{array}$	12. $\begin{array}{r} 6 \\ 2 \\ + 4 \\ \hline 12 \end{array}$
13. $\begin{array}{r} 4 \\ 4 \\ + 2 \\ \hline 10 \end{array}$	14. $\begin{array}{r} 5 \\ 4 \\ + 5 \\ \hline 14 \end{array}$	15. $\begin{array}{r} 2 \\ 7 \\ + 3 \\ \hline 12 \end{array}$	16. $\begin{array}{r} 3 \\ 4 \\ + 5 \\ \hline 12 \end{array}$	17. $\begin{array}{r} 6 \\ 4 \\ + 5 \\ \hline 15 \end{array}$	18. $\begin{array}{r} 4 \\ 7 \\ + 4 \\ \hline 15 \end{array}$

Find the winners!

19. **Greens**

	1st	2nd	3rd	
Blues	7	2	3	= 12
Greens	4	6	3	= 13

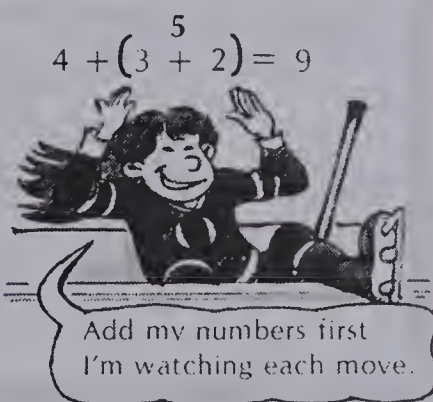
20. **Oranges**

	1st	2nd	3rd	
Yellows	3	2	5	= 10
Oranges	5	4	9	= 18

## Betty Brackets

Betty Brackets shows us how to add three numbers her way.

- |                       |                       |
|-----------------------|-----------------------|
| 1. $(7 + 2) + 2 = 11$ | 2. $3 + (2 + 6) = 11$ |
| 3. $2 + (6 + 4) = 12$ | 4. $(4 + 4) + 7 = 15$ |
| 5. $(8 + 0) + 5 = 13$ | 6. $6 + (5 + 4) = 15$ |
| 7. $(2 + 6) + 6 = 14$ | 8. $7 + (5 + 3) = 15$ |



13

## Assigning the Practice

Minimum: Even numbers

Average: All

Enriched: All

## Reinforcement

1. Introduce *Betty Brackets*, page 13. Explain that brackets mean to "add first".
2. Play a three-addends hockey game by supplying a group of students with 20 cardboard pucks and three dice. In turn, each player rolls the three dice once and finds the sum. The child with the largest sum after each turn takes one puck. Repeat until all the pucks are taken. The student with the most pucks at the end is the winner.

## Enrichment

1. Challenge your students to make sums of 1 to 18 using just 2 or 3 cards from an addend set.

0 1 1 3 3 9 9

2. Help the children make a card game called "Eleven", similar to Rummy, in which three cards adding to 11 are sought. They will need to decide how many cards to make and which numbers to put on them. Three cards are dealt to each child. Excess cards are placed face down in a pile. At their turn, players can either draw and discard a card or trade a card with another player. Whenever they have three cards adding to 11 they set them down to be counted. When the pile has been used up, the player with the greatest number of 11s is the winner.

3. Have the students investigate the number of ways three addends can be arranged horizontally. (Six ways.)  
 $2 + 4 + 5$        $2 + 5 + 4$        $4 + 2 + 5$   
 $4 + 5 + 2$        $5 + 4 + 2$        $5 + 2 + 4$

4. Have the students use four or more addends by giving the number of runs per inning in 9-inning baseball games. Ask the students to find the scores and winners. Write several examples on a worksheet. Have the students circle the winning teams.

Inning		1	2	3	4	5	6	7	8	9	Score
Runs	Red	3	0	0	1	2	0	0	5	0	11
	Blue	2	1	0	0	0	2	3	1	1	10

## Extra Practice

## Worksheet A4

Pages 12-13

Add.

- |                      |                      |
|----------------------|----------------------|
| 1. $2 + 6 + 5 = 13$  | 2. $3 + 8 + 1 = 12$  |
| 3. $4 + 0 + 7 = 11$  | 4. $9 + 6 + 1 = 16$  |
| 5. $4 + 3 + 7 = 14$  | 6. $4 + 2 + 1 = 7$   |
| 7. $2 + 3 + 8 = 13$  | 8. $4 + 4 + 6 = 14$  |
| 9. $7 + 5 + 5 = 17$  | 10. $8 + 3 + 7 = 18$ |
| 11. $9 + 1 + 9 = 19$ | 12. $6 + 7 + 4 = 17$ |



## Objective M2

Find the perimeters of triangles by measuring and adding.

## Introducing the Lesson

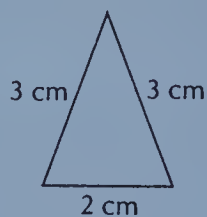
Draw several figures on the board. Have the students determine which are triangles. Explain these properties of triangles: three straight *sides*, an inside and an outside. Use the following shapes and lines to discuss figures that are *not* triangles.



## Teaching the Lesson

Measure the *distance around* several objects using centimetre strings (strings with centimetre intervals marked with a coloured felt pen).

Point out that the word *perimeter* means the *distance around*. Explain that it can also be thought of as the *total length of the sides*. Show that a centimetre ruler can measure the perimeters of objects having straight sides. Draw some polygons (mostly triangles) on the chalkboard and have the children measure the perimeters in *centimetres*. Have them do several examples until it is well understood how to measure each side, record the measurement, and total the sides.



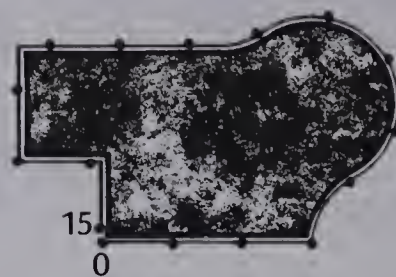
$$\begin{array}{r} 2 \text{ cm} \\ 3 \text{ cm} \\ + 3 \text{ cm} \\ \hline 8 \text{ cm Perimeter} \end{array}$$

Have the children work in pairs to find the perimeters of four construction paper triangles by measuring the sides. Be sure they properly label each sum.

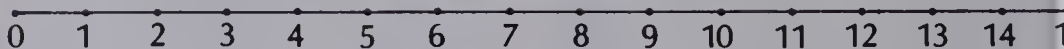
Use real-life situations to illustrate the perimeter of a triangle. Example: Lori has a triangular hanky with sides of 7 cm, 4 cm, and 4 cm. How much lace is needed to go around the edge of the hanky?

# Perimeter of a Triangle

The **perimeter** of a figure is the distance around it.

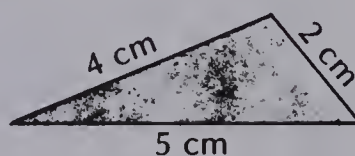


This figure has a perimeter of 15 cm (centimetres).



A **triangle** has 3 straight sides.

Its perimeter is the sum of the lengths of its sides.

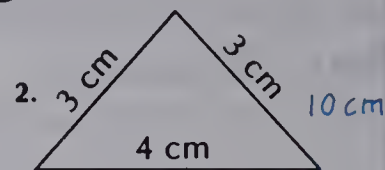
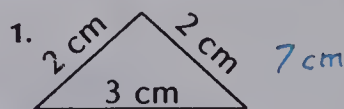


$$\begin{array}{r} 4 \\ 2 \\ + 5 \\ \hline 11 \end{array}$$

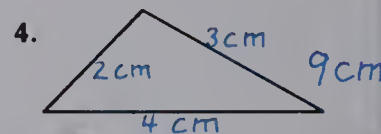
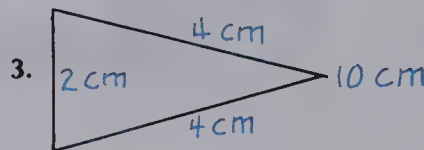
The perimeter of this triangle is 11 cm.

## EXERCISES

Find the perimeter of each triangle.



Measure the sides and find each perimeter.

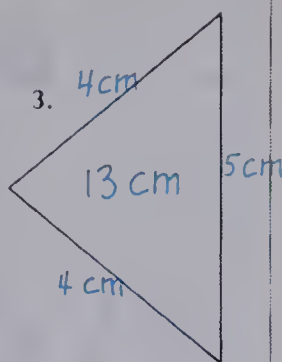
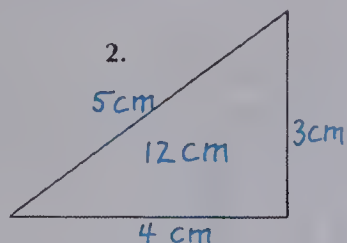
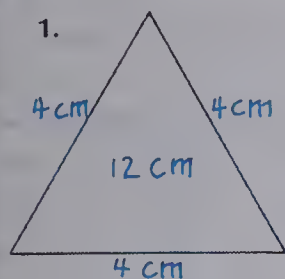


## Using the Exercises

- In Questions 1 and 2 no measurement is required. Students must add to find the perimeter.
- In Questions 3 and 4 they must first measure the sides of the triangle.

## PRACTICE

Measure the sides and find each perimeter.



Add.

4.	3 cm	5.	5 cm	6.	4 cm	7.	5 cm	8.	3 cm
	5 cm		4 cm		4 cm		3 cm		3 cm
	+ 6 cm		+ 3 cm		+ 7 cm		+ 5 cm		+ 9 cm
	<u>14</u>		<u>12</u>		<u>15</u>		<u>13</u>		<u>15</u>

9. Draw a triangle using the lengths in Question 4.

10. Try to draw a triangle for Question 8. *Not possible.*  
Tell what happens. *Total of 2 sides shorter than the other — so they can't meet.*

## Assigning the Practice

Minimum: 1-8

Average: 1-8

Enriched: 1-10

## Reinforcement

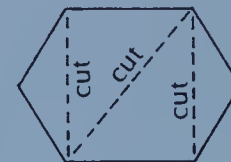
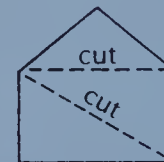
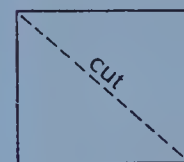
1. Assign *Mascot's Mistakes*, page 15.

2. Ask the students to use their centimetre strings to measure the distance around objects in the classroom.

3. Have the students work in pairs. Ask them to make 5 triangles with their centimetre rulers. They exchange these triangles with their partners, who then will measure and label all sides of the triangles and find the perimeter for each.

## Enrichment

1. Investigate how polygons can be cut into triangles.

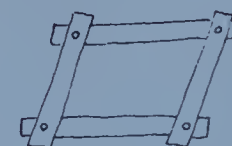
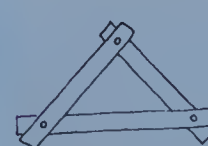


Number of Sides	Number of Cuts	Number of Triangles
4	1	2
5	2	3
6	3	4

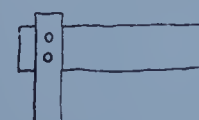
2. Ask the children to trace and cut many black paper triangles. Encourage them to form designs and paste them on paper.

3. With a trundle wheel or measuring tape, measure the perimeter of the room, the chalkboard, the teacher's desk, and other large polygons.

4. Use stiff cardboard girders and fasteners to build triangles and quadrilaterals. From them, discover that triangles are *rigid* and strong, whereas other polygons are not.

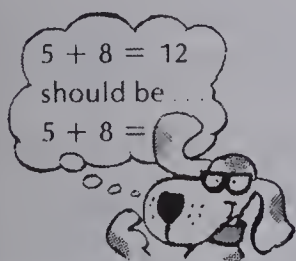


Investigate what happens when this type of joint is used. (It makes some polygons rigid.)



## Mascot's Mistakes

Mascot put in the blue sums.  
Can you change his 6 mistakes?



+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	
2	2	3	4	5	6	7	8	9	10		
3	3	4	5	6	7	8	9	10			
4	4	5	6	7	8	9	10				
5	5	6	7	8	9	10		12	13		
6	6	7	8	9	10					15	16
7	7	8	9	10	11					16	17
8	8	9	10			13	14		16	17	18
9	9	10						16	17	18	19
10	10						16	17	18	19	20

15

## Extra Practice

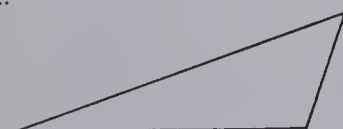
## Worksheet M2

Pages 14-15

Measure the sides and find the perimeter.



2.



4 + 3 + 5 = 12 cm

6 + 2 + 5 = 13 cm

Add.

4 cm	4.	5 cm	5.	5 cm	6.	6 cm
5 cm		4 cm		4 cm		3 cm
+ 6 cm		+ 4 cm		+ 7 cm		+ 5 cm
<u>15 cm</u>		<u>13 cm</u>		<u>16 cm</u>		<u>14 cm</u>



## Objective PS1

Use only the relevant numbers in word problems.




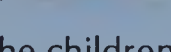
## Introducing the Lesson

Review the kinds of equipment used for the sports on page 16: baseball, tennis, bowling, basketball, snorkeling, hockey, and archery. Discuss each carefully as you show either real equipment or pictures and make a list of the sports on the chalkboard. Stress an understanding of terms for each sport, for example, archery, bow, arrow, target, quiver.

## Teaching the Lesson

To develop the ability to recognize important information and extra information, list three sports equipment terms on the chalkboard, one of which "doesn't belong". Ask the children to pick the one that does not belong. Do several examples.

Draw an "extra information" question on the chalkboard similar to those on page 16, for example:

- A. 3  B is extra.  
 B. 2   $3 + 4 + 1 = 8$   
 C. 4  8 things for ping pong  
 D. 1 

Ask the children to suggest similar problems for everyone to solve.

Note with the children the newspaper format of page 16. Read the "extra information" given at the top of the page and orally solve question 0 with the children. Assign questions 1 to 6 to be solved in a similar way.

## Enrichment

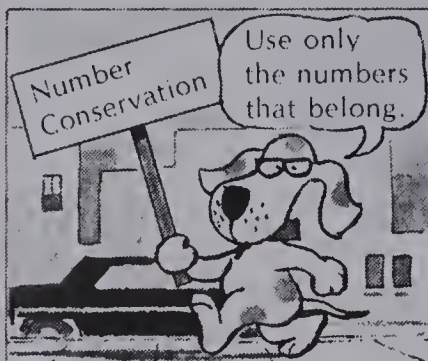
1. Assign *PastimeS* at the bottom of page 16. This could take some children several days to solve. Give hints sparingly.
2. Provide students with cards on which to prepare "extra information" questions for the class.




Sunny  
High 15°  
Low 9°

## EXTRA INFORMATION

Sports Page

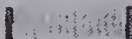

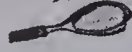
50¢  
Daily

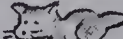





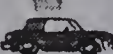

0. A. 40   
 B. 7   
 C. 9   
 For baseball?


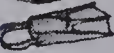


0. C is extra.  





$$\begin{array}{r} 40 \\ + 7 \\ \hline 47 \end{array}$$
  
 47 for baseball


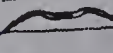


1. A. 3   
 B. 30   
 C. 20   
 For tennis?  
 $20 + 3 = 23$

2. A. 8   
 B. 9   
 C. 9   
 For bowling?  
 $9 + 9 = 18$

3. A. 8   
 B. 7   
 C. 8   
 For basketball?  
 $8 + 8 = 16$

4. A. 6   
 B. 3   
 C. 9   
 D. 7   
 For swimming?  
 $6 + 3 = 9$

5. A. 5   
 B. 4   
 C. 7   
 D. 6   
 For hockey?  
 $5 + 4 + 6 = 15$

6. A. 3   
 B. 3   
 C. 3   
 D. 4   
 For archery?  
 $3 + 3 + 3 = 9$

## PastimeS

Mascot's  
dog pen.



1. Make 4 triangle "dog pens" using only 9 straws and tape.
2. Using tape and 6 straws make 4 square dog pens.

## Problem Solving Activities

Assign Level 3, Unit 1.



# Sports Story

Dear Student,

I enjoy playing many sports. I skied 2 hours on Saturday, 7 hours on Sunday, and 5 hours on Monday.

I also play football with friends. At the last game we had 20 points and only 4 seconds left. My friend Frisky scored 6 points before the buzzer. We plan to have 7 games this month and 8 next month.

My favourite sport is swimming. I can backstroke 6 laps and dog paddle 5 more. Can you dog paddle?

Your helper, Mascot



## P.S.

- How many laps can I swim in all? 11
- How many football games will we play? 15
- How many hours did I ski one week? 14
- After Frisky scored, what was our point total? 26
- How many hours did I ski one weekend? 9

## REVIEW

Add.

A3	1.	9	2.	9	3.	8	4.	8	5.	7
		+ 7		+ 9		+ 9		+ 8		+ 9
		<u>16</u>		<u>18</u>		<u>17</u>		<u>16</u>		<u>16</u>
A4	6.	8	7.	5	8.	7	9.	5	10.	7
		2		6		2		4		6
		+ 5		+ 5		+ 1		+ 2		+ 2
		<u>15</u>		<u>16</u>		<u>10</u>		<u>17</u>		<u>15</u>

17

## Objective PS2

Locate information for addition questions from a short paragraph.

## Introducing the Lesson

Ask a sports question involving addition. "Tom swam three lengths of the pool on Monday, four on Tuesday, and five on Wednesday. How many lengths did he swim altogether?" Write the sum ( $3 + 4 + 5$ ) on the chalkboard and have the children complete it as an addition equation ( $3 + 4 + 5 = 12$ ). Ask them to think of a sentence that would tell the total number of lengths Tom swam. Write this as a concluding sentence:  $3 + 4 + 5 = 12$  Tom swam 12 lengths.

## Teaching the Lesson

Carefully read and discuss with the class the sports story on page 17. Review any difficult vocabulary. Choose a few sports questions from the story to be answered with an addition equation and concluding sentence. Show the appropriate responses on the chalkboard. Assign the five questions on page 17 to be answered in a similar way.

## Enrichment

Lead a group in composing a sports story. Include numerical references in each sentence which can lead to addition questions involving basic facts, three addends, and expanded form. Have the students suggest suitable questions.

Alternatively, allow pairs of children to compose short math stories with suitable addition questions. Organize the results in a Sports Story Question display. Provide worksheets near the display with space for equations and concluding statements.

## Review Exercises

Questions	Objective	Pages
1-5	A3	10-11
6-10	A4	12-13

## Extra Practice

## Worksheet PS1-PS2

Pages 16-17

Cross out the extra fact.  
Solve the problem.

- 6 hats  
~~4 shirts~~  
How many hats? 6
- 9 daisies  
~~4 rocks~~  
How many flowers? 9
- 8 red pencils  
~~4 blue crayons~~  
2 yellow pencils  
How many pencils? 10
- ~~6 pennants~~  
6 hockey cards  
6 baseball cards  
How many cards? 12

# UNIT 1 100 CHART

## Suggestions

Show 8¢. Explain that you are going to **count by 10s** from 8¢ by adding a dime at each step. As this is done, record the numbers in a column. Discuss the obvious number pattern. Repeat with other beginning amounts. Relate counting by 10s to adding 10.

“4¢, 14¢, 24¢...” “37¢, 47¢, 57¢...”

## About the Page

Refer to the 100 chart on page 18. Read *Counting by 10s* at the bottom of the page and discuss the pattern found on the chart. (The numbers increase by 10 in each column.)

Show how the 100 chart can be used to count forward by tens.

Use the 100 chart to **count by 9s** and add 9. Read and discuss the pattern in the *Counting by 9s* problem on page 18 and then try other similar problems: “9, 18, 27...” “16, 25, 34...” “51, 60, 69...” Review the add-nine strategy introduced on page 10 (first add 10, then subtract 1). Illustrate this strategy for counting by 9s on the 100 chart (usually down 1 and left 1).

All students who understand how to use the 100 chart should be able to do questions 1 to 12 on page 18.

## Reinforcement

Use group recitation for counting by 10s and 9s. Draw attention to the language and rhythmic patterns.

## Enrichment

To develop the idea of two views of Mascot’s bowl shown on page 18, play this Top, Side, End Game. Using an overhead projector, show the top, side, and end views of a “mystery” object. Shield the sides from the class with cardboard. Have them guess such things as a stapler, a paste jar, a tape roll, scissors, an apple, a banana, and so on.

# Mascot’s Super Bowl Games

## COUNTING BY 10’S

Count by 10’s by adding another ten each time. Find these numbers on the chart: 18 28 38 48 58.

Do you see the pattern? *vertical line*

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

MASCOT

## COUNTING BY 9’S

Find these numbers on the 100 chart:

7, 16, 25, 34, 43, 52, 61, 70, 79.

What pattern do you see? *diagonal line*

Count on by 10’s from:

1. 5 to 95

2. 24 to 94

3. 11 to 91

Count on by 9’s from:

4. 8 to 71

5. 19 to 91

6. 6 to 96

Add.

7. 5 + 10 *15*

8. 24 + 10 *34*

9. 41 + 10 *51*

10. 8 + 9 *17*

11. 19 + 9 *28*

12. 16 + 9 *25*

M

18

side

## Post-test

Unit

Add.

$$\begin{array}{r} 1. \quad 50 \\ + 8 \\ \hline 58 \end{array}$$

$$\begin{array}{r} 2. \quad 60 \\ + 7 \\ \hline 67 \end{array}$$

$$\begin{array}{r} 3. \quad 90 \\ + 1 \\ \hline 91 \end{array}$$

$$\begin{array}{r} 4. \quad 8 \\ + 40 \\ \hline 48 \end{array}$$

$$\begin{array}{r} 5. \quad 7 \\ + 20 \\ \hline 27 \end{array}$$

$$\begin{array}{r} 6. \quad 8 \\ + 2 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 7. \quad 6 \\ + 5 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 8. \quad 8 \\ + 7 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 9. \quad 5 \\ + 5 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 10. \quad 6 \\ + 9 \\ \hline 15 \end{array}$$

11. How long is the line in centimetres?

\_\_\_\_\_ *13* cm

Add.

$$\begin{array}{r} 12. \quad 8 \\ + 6 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 13. \quad 7 \\ + 5 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 14. \quad 5 \\ + 8 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 15. \quad 7 \\ + 7 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 16. \quad 3 \\ + 9 \\ \hline 12 \end{array}$$



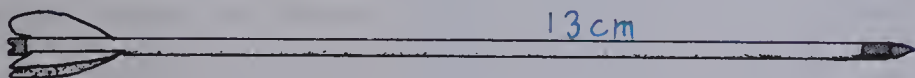
# UNIT 1

# TEST

Add.

1.  $60 + 3 = 63$  2.  $10 + 8 = 18$  3.  $90 + 8 = 98$  4.  $20 + 3 = 23$  5.  $9 + 10 = 19$
6.  $8 + 3 = 11$  7.  $6 + 4 = 10$  8.  $3 + 7 = 10$  9.  $9 + 6 = 15$  10.  $7 + 8 = 15$

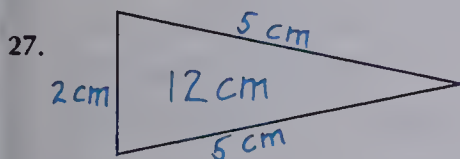
11. How long is the arrow in centimetres?



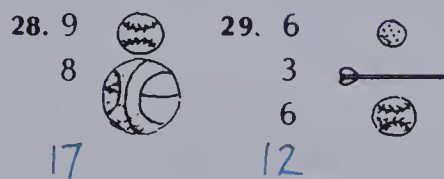
Add.

12.  $8 + 5 = 13$  13.  $7 + 5 = 12$  14.  $8 + 6 = 14$  15.  $7 + 6 = 13$  16.  $8 + 4 = 12$
17.  $8 + 8 = 16$  18.  $7 + 9 = 16$  19.  $9 + 9 = 18$  20.  $9 + 8 = 17$  21.  $9 + 7 = 16$
22.  $4 + 6 = 10$  23.  $4 + 6 = 10$  24.  $3 + 2 = 5$  25.  $6 + 2 = 8$  26.  $8 + 7 = 15$
27.  $4 + 4 = 8$  28.  $3 + 3 = 6$  29.  $6 + 2 = 8$  30.  $8 + 7 = 15$  31.  $10 + 6 = 16$

Measure the sides and find the perimeter.



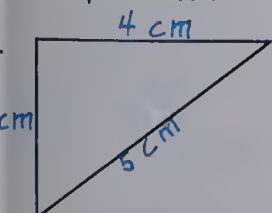
How many balls?



Unit 1 Objective	Test Questions	Pages
N1	1-5	2-3
A1	6-10	4-5
M1	11	6-7
A2	12-16	8-9
A3	17-21	10-11
A4	22-26	12-13
M2	27	14-15
PS	28-29	

1.  $8 + 9 = 17$  2.  $1 + 3 = 4$  3.  $2 + 4 = 6$  4.  $3 + 5 = 8$  5.  $4 + 6 = 10$
6.  $5 + 7 = 12$  7.  $6 + 8 = 14$  8.  $7 + 9 = 16$  9.  $8 + 10 = 18$  10.  $9 + 11 = 20$

Find the perimeter.



4 red apples  
6 green apples  
3 oranges

28. How many fruit? 13

4 + 3 + 5 = 12 cm 29. How many apples? 10

# UNIT 2

## Subtraction Facts

Theme: Signs of Autumn

Lesson		Objective	Vocabulary	Materials
Preview		Review subtraction facts to 9.	subtract, take away, minus, less	addition and subtraction fact cards, an autumn scene
1	A5	Relate addition and subtraction facts to 10 and to 11.	four related facts	domino-like cards, fact cards for 10 and 11
2	A6	Subtract 1 and 10 and count back by ones and tens.	count back by 10s, 1s	boxes of crayons, play money (ten and one dollar bills)
3	A7	Subtract 9 and subtract using doubles to 18.	doubles	
4	M3	Experience the importance of 10 in the metric system by estimating and measuring lengths in decimetres and centimetres.	decimetre, centimetre, length, width	100 decimetre strips (1 dm long), 300 centimetre strips, centimetre rulers, centimetre tape, metre stick
5	A8	Subtract from 12 and 13 by counting back strategies.	subtraction table	wall number line, two centimetre rulers, floor number line, fact cards
6	N2	Read and use ordinals and dates to the thirty-first (31st).	ordinal number, in order, first, second to thirty-first	ordinal number and word jigsaw puzzle, 31 small objects
7	A9	Use <i>bridging with 10</i> strategy for subtraction facts to 18 with emphasis on 14 to 17 facts.	difference, bridging with 10	number line to 20
8	PS3	Associate word problems with appropriate concrete models, pictorial models, and equations.	together, to gather, a part, to part, word problem	a variety of objects
	PS4	Draw appropriate pictures not suggesting movement for addition and subtraction word problems.		word problem cards
Test		Subtraction facts to 18		
Review		Addition facts to 18		



# About This Unit

Mastery of subtraction facts to 18 is the primary focus of Unit 2. The development of numerals to 100 begun in Unit 1 is extended as a preview to Unit 3, "Numerals to 9999".

Research findings and classroom practice have shown that it is easier for students to master the 100 subtraction facts if they use thinking strategies. As with addition, students should not be asked to master subtraction facts in an unorganized manner or in an artificially organized manner (the smaller-to-larger approach.) The Houghton Mifflin subtraction facts development program uses three fundamental themes:

1. Presentations and exercises that relate subtraction and addition facts are used. In particular, refer to Lessons 1, 3, 5, and 7.

6	5	11	11
+5	+6	- 6	- 5
11	11	5	6

2. Subtraction involving 10 is used to unify strategies for subtraction. Lessons 1, 2, 3, 4, and 7 in particular carefully build on each other and should be followed as given in the text. For example, the strategy used in Lesson 3 for *subtracting 9* is a special case of the very effective *bridging with 10* strategy of Lesson 7.

To do

$$\begin{array}{r} 13 \\ - 9 \\ \hline \end{array}$$

Think

$$\begin{array}{r} 3 \\ +1 \\ \hline 4 \end{array}$$

To do

$$\begin{array}{r} 14 \\ - 6 \\ \hline \end{array}$$

Think

$$\begin{array}{r} 4 \\ +4 \\ \hline 8 \end{array}$$

Although the *bridging with 10* strategy for grade 3 students is eventually superceded by rote recall, its basic form is useful in areas of math developed later. For example, one can mentally calculate  $365 - 196$  as  $165 + 4 = 169$ .

3. The subtraction facts are covered in a carefully designed sequence and frequency to facilitate memorization. Games, activities, and an appropriate quiz schedule support the goal of mastery. As with

addition, this program does *not* presume that all subtraction facts are mastered before 2-digit subtraction is introduced in Unit 5, "Subtraction". (Read the introduction of Unit 5 to see how the Subtraction Fact Master makes this practical.)

It is strongly recommended that manipulative materials be used as suggested in Lessons 2, 4, and 8, even by students who appear to have achieved mastery. The development of the more difficult number concepts and of problem solving later on requires concrete links with easier material.

Lesson 2 Subtracting 10 and 1 using play money bills.

Lesson 4 Measurement in decimetres and centimetres with decimetre and centimetre strips.

Lesson 8 Word problems associated with concrete and pictorial models.

## Ideas

The theme of Unit 2 is *Signs of Autumn*. Take time before you begin this subtraction unit to preview how the theme is woven into the presentation, illustrations, and exercises. Some of the following aids may be useful in teaching the unit.

1. Domino-like cards are invaluable for practice involving related addition and subtraction facts. (See, for example, activity 2 in the Reinforcement on page 23.)



2. An ordinal number jigsaw puzzle can be made from tag board. Ordinal number words to *thirty-first* appear on one side of the pieces and numerical abbreviations to *31st* on the other.



3. Provide a Subtraction Fact Master for each student. This device is quite useful for recording a student's progress with subtraction facts quizzes. It is also invaluable when beginning Unit 5 if some of the children are still memorizing subtraction facts. The Reinforcement section on page 35 and the Ideas sections of Units 1 and 5 give further information.

- Other subtraction strategies than those found in Unit 2 may be introduced and studied. In particular, *subtracting 8 is equivalent to subtracting 10 and adding 2*. This is a special case of *bridging with 10* found in Lesson 7.
- Investigate the migration of birds. A good resource is the August, 1979, *National Geographic* map, "Bird Migration in the Americas". Discuss how other animals prepare for winter.



Unit 2 Objective	Test Questions	Pages
A5	1-5	22-23
A6	6-10	24-25
A7	11-15	26-27
M3	16-17	28-29
A8	18-22	30-31
N2	23-24	32-33
A9	25-29	34-35
PS	30-31	

# UNIT 2

## SUBTRACTION FACTS

### Pretest

Subtract.

- |  |   |  |  |   |
|--|---|--|--|---|
| 1. $\begin{array}{r} 10 \\ - 7 \\ \hline 3 \end{array}$  | 2. $\begin{array}{r} 11 \\ - 5 \\ \hline 6 \end{array}$   | 3. $\begin{array}{r} 10 \\ - 4 \\ \hline 6 \end{array}$  | 4. $\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$  | 5. $\begin{array}{r} 11 \\ - 9 \\ \hline 2 \end{array}$   |
| 6. $\begin{array}{r} 23 \\ - 1 \\ \hline 22 \end{array}$ | 7. $\begin{array}{r} 23 \\ - 10 \\ \hline 13 \end{array}$ | 8. $\begin{array}{r} 17 \\ - 1 \\ \hline 16 \end{array}$ | 9. $\begin{array}{r} 17 \\ - 10 \\ \hline 7 \end{array}$ | 10. $\begin{array}{r} 15 \\ - 1 \\ \hline 14 \end{array}$ |
| 11. $\begin{array}{r} 14 \\ - 9 \\ \hline 5 \end{array}$ | 12. $\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$  | 13. $\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$ | 14. $\begin{array}{r} 14 \\ - 7 \\ \hline 7 \end{array}$ | 15. $\begin{array}{r} 16 \\ - 9 \\ \hline 7 \end{array}$  |

Complete the equation

16.  $7 \text{ dm} = \underline{70} \text{ cm}$       17.  $7 \text{ dm} + 2 \text{ cm} = \underline{72} \text{ cm}$

Unit 2



# Needle in the Haystack

Haystack A

1. $\begin{array}{r} 6 \\ - 3 \\ \hline 3 \end{array}$	2. $\begin{array}{r} 8 \\ - 1 \\ \hline 7 \end{array}$	3. $\begin{array}{r} 3 \\ + 2 \\ \hline 5 \end{array}$	4. $\begin{array}{r} 8 \\ - 2 \\ \hline 6 \end{array}$
5. $\begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array}$	6. $\begin{array}{r} 4 \\ - 3 \\ \hline 1 \end{array}$	7. $\begin{array}{r} 5 \\ - 2 \\ \hline 3 \end{array}$	8. $\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$
9. $\begin{array}{r} 8 \\ - 4 \\ \hline 4 \end{array}$	10. $\begin{array}{r} 5 \\ - 1 \\ \hline 4 \end{array}$	11. $\begin{array}{r} 5 \\ - 3 \\ \hline 2 \end{array}$	12. $\begin{array}{r} 4 \\ - 1 \\ \hline 3 \end{array}$
13. $\begin{array}{r} 4 \\ - 0 \\ \hline 4 \end{array}$	14. $\begin{array}{r} 3 \\ + 3 \\ \hline 6 \end{array}$	15. $\begin{array}{r} 7 \\ - 2 \\ \hline 5 \end{array}$	16. $\begin{array}{r} 9 \\ - 4 \\ \hline 5 \end{array}$

Haystack B

1. $\begin{array}{r} 7 \\ - 4 \\ \hline 3 \end{array}$	2. $\begin{array}{r} 9 \\ - 2 \\ \hline 7 \end{array}$	3. $\begin{array}{r} 1 \\ + 4 \\ \hline 5 \end{array}$	4. $\begin{array}{r} 9 \\ - 3 \\ \hline 6 \end{array}$
5. $\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$	6. $\begin{array}{r} 9 \\ - 8 \\ \hline 1 \end{array}$	7. $\begin{array}{r} 8 \\ - 5 \\ \hline 3 \end{array}$	8. $\begin{array}{r} 5 \\ + 3 \\ \hline 8 \end{array}$
9. $\begin{array}{r} 7 \\ - 3 \\ \hline 4 \end{array}$	10. $\begin{array}{r} 9 \\ - 5 \\ \hline 4 \end{array}$	11. $\begin{array}{r} 8 \\ - 6 \\ \hline 2 \end{array}$	12. $\begin{array}{r} 9 \\ - 6 \\ \hline 3 \end{array}$
13. $\begin{array}{r} 6 \\ - 2 \\ \hline 4 \end{array}$	14. $\begin{array}{r} 7 \\ - 5 \\ \hline 2 \end{array}$	15. $\begin{array}{r} 6 \\ - 1 \\ \hline 5 \end{array}$	16. $\begin{array}{r} 8 \\ - 3 \\ \hline 5 \end{array}$

## UNIT 2 PREVIEW

### Suggestions

With an autumn scene on display, review the characteristics of autumn. Focus on an understanding of such concepts as harvest and farmers' market. Find out if any children have had experience with harvesting hay or with haystacks. Discuss the expression "looking for a needle in a haystack" without overly stressing the difficulty of the task. Tell the children that they will be looking for a needle in a haystack in this lesson, yet their task will not be impossible.

Write four subtraction facts in a haystack drawn on the chalkboard (one with an incorrect answer). Ask the children to find the error or the "needle in the haystack".

$\begin{array}{r} 6 \\ - 4 \\ \hline 2 \end{array}$	$\begin{array}{r} 9 \\ - 1 \\ \hline 7 \end{array}$	$5 - 1 = 4$
		$7 - 3 = 4$

Once the error has been found, draw a picture of the problem on the chalkboard. Ask one of the students to cross out the amount taken away to prove the correct answer.



"Nine minus one is eight."

Continue this procedure using the subtraction terms **subtract**, **take away**, **minus**, and **less**.

### About the Page

Let the children match their answers from haystacks A and B on page 21. Number 14 is the "needle in the haystack".

### Reinforcement

Give a short, simple quiz using subtraction fact cards. Show the students how to use the subtraction Fact Master.

tract.

12 $\begin{array}{r} 12 \\ - 8 \\ \hline 4 \end{array}$	19. $\begin{array}{r} 13 \\ - 7 \\ \hline 6 \end{array}$	20. $\begin{array}{r} 13 \\ - 4 \\ \hline 9 \end{array}$	21. $\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$	22. $\begin{array}{r} 13 \\ - 8 \\ \hline 5 \end{array}$
--	---	---	---	---

Circle the twelfth number.      24. Circle the 15th number.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

tract.

17 $\begin{array}{r} 17 \\ - 9 \\ \hline 8 \end{array}$	26. $\begin{array}{r} 15 \\ - 8 \\ \hline 7 \end{array}$	27. $\begin{array}{r} 13 \\ - 6 \\ \hline 7 \end{array}$	28. $\begin{array}{r} 16 \\ - 7 \\ \hline 9 \end{array}$	29. $\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$
--	---	---	---	---

e.

9 roses 8 carnations How many flowers? <b>17</b>	31. 16 glasses 7 are filled. How many are empty? <b>9</b>
--	---

# UNIT 2 LESSON 1

## Objective A5

Relate addition and subtraction facts to 10 and to 11.

## Introducing the Lesson

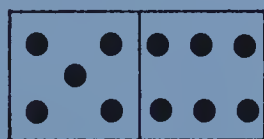
Using concrete materials, demonstrate four related addition and subtraction facts as pictured on page 22. Show several combinations and have the children determine and record the four **related facts** or **fact families**.

$$4 + 5 = 9 \quad \begin{array}{c} \text{4 stalks} \\ \text{5 stalks} \end{array} \quad 9 - 4 = 5$$

$$5 + 4 = 9 \quad \begin{array}{c} \text{5 stalks} \\ \text{4 stalks} \end{array} \quad 9 - 5 = 4$$

## Teaching the Lesson

Display a domino card. Ask the children to say and write the four related facts.



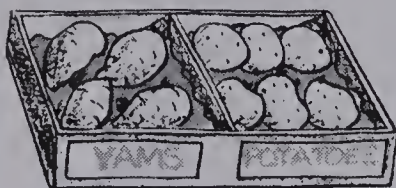
Write three related facts on the chalkboard ( $7 + 3 = 10$ ,  $3 + 7 = 10$ ,  $10 - 3 = 7$ ) and have the children name the missing fact. For other examples gradually show fewer and fewer members of a fact family.

Display three numerals (4, 7, 11) and direct the children to find four related facts. Do other examples until the concept is clearly understood.

Use the addition and subtraction flash cards to drill the facts for 10 and 11.

## Related Facts

Each produce stand gives us 4 facts.

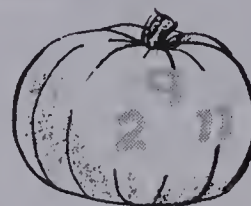


$$\begin{array}{r} 10 \\ - 6 \\ \hline 4 \end{array} \quad \begin{array}{r} 10 \\ - 4 \\ \hline 6 \end{array} \quad \begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array} \quad \begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$$



$$\begin{array}{r} 10 \\ - 7 \\ \hline 3 \end{array} \quad \begin{array}{r} 10 \\ - 3 \\ \hline 7 \end{array} \quad \begin{array}{r} 7 \\ + 3 \\ \hline 10 \end{array} \quad \begin{array}{r} 3 \\ + 7 \\ \hline 10 \end{array}$$

These 3 numbers can be made into 2 addition facts and 2 subtraction facts.



$$\begin{array}{r} 11 \\ - 9 \\ \hline 2 \end{array} \quad \begin{array}{r} 11 \\ - 2 \\ \hline 9 \end{array} \quad \begin{array}{r} 9 \\ + 2 \\ \hline 11 \end{array} \quad \begin{array}{r} 2 \\ + 9 \\ \hline 11 \end{array}$$

## EXERCISES

Give the two missing subtraction facts.

1.  $\begin{array}{r} 6 \\ - 4 \\ \hline 2 \end{array}$  2  $\begin{array}{r} 6 \\ - 2 \\ \hline 4 \end{array}$  4

2.  $\begin{array}{r} 11 \\ - 6 \\ \hline 5 \end{array}$  6  $\begin{array}{r} 11 \\ - 5 \\ \hline 6 \end{array}$  6

3.  $\begin{array}{r} 7 \\ - 5 \\ \hline 2 \end{array}$  2  $\begin{array}{r} 7 \\ - 2 \\ \hline 5 \end{array}$  5

4.  $\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$  2  $\begin{array}{r} 10 \\ - 2 \\ \hline 8 \end{array}$  8

22

## Using the Exercises

- Questions 1 to 4 ask for the two missing subtraction members of a fact family. The students can use either the domino models (Questions 1 and 2) or a set of three numbers to think of the missing subtractions.



## PRACTICE

Subtract.

- |  |  |  |  |  |  |
|--|--|--|--|--|--|
| 1. $\begin{array}{r} 10 \\ - 1 \\ \hline 9 \end{array}$  | 2. $\begin{array}{r} 10 \\ - 9 \\ \hline 1 \end{array}$  | 3. $\begin{array}{r} 10 \\ - 2 \\ \hline 8 \end{array}$  | 4. $\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$  | 5. $\begin{array}{r} 10 \\ - 7 \\ \hline 3 \end{array}$  | 6. $\begin{array}{r} 10 \\ - 5 \\ \hline 5 \end{array}$  |
| 7. $\begin{array}{r} 11 \\ - 5 \\ \hline 6 \end{array}$  | 8. $\begin{array}{r} 11 \\ - 6 \\ \hline 5 \end{array}$  | 9. $\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$  | 10. $\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$ | 11. $\begin{array}{r} 11 \\ - 4 \\ \hline 7 \end{array}$ | 12. $\begin{array}{r} 11 \\ - 7 \\ \hline 4 \end{array}$ |
| 13. $\begin{array}{r} 10 \\ - 3 \\ \hline 7 \end{array}$ | 14. $\begin{array}{r} 11 \\ - 9 \\ \hline 2 \end{array}$ | 15. $\begin{array}{r} 10 \\ - 4 \\ \hline 6 \end{array}$ | 16. $\begin{array}{r} 11 \\ - 2 \\ \hline 9 \end{array}$ | 17. $\begin{array}{r} 10 \\ - 6 \\ \hline 4 \end{array}$ | 18. $\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$ |

Show the four related facts for each problem.

19.  $\begin{array}{|c|c|} \hline \bullet \bullet \bullet \bullet \bullet \bullet \\ \hline \bullet \\ \hline \end{array}$   $\begin{array}{r} 2 \ 9 \\ + 9 \ + 2 \\ \hline 11 \ 11 \end{array}$  20.  $\begin{array}{|c|c|} \hline \bullet \bullet \bullet \bullet \bullet \bullet \\ \hline \bullet \bullet \\ \hline \end{array}$   $\begin{array}{r} 3 \ 7 \\ + 7 \ + 3 \\ \hline 10 \ 10 \end{array}$  21.  $\begin{array}{|c|c|} \hline \bullet \bullet \bullet \bullet \bullet \bullet \\ \hline \bullet \bullet \bullet \bullet \bullet \bullet \\ \hline \end{array}$   $\begin{array}{r} 8 \ 3 \\ + 3 \ + 8 \\ \hline 11 \ 11 \end{array}$
22.  $\begin{array}{r} 10 \ 10 \\ - 3 \ - 7 \\ \hline 7 \ 3 \end{array}$   $\begin{array}{r} 3 \ 7 \\ + 7 \ + 3 \\ \hline 10 \ 10 \end{array}$  23.  $\begin{array}{r} 11 \ 11 \\ - 4 \ - 7 \\ \hline 7 \ 4 \end{array}$   $\begin{array}{r} 7 \ 4 \\ + 4 \ + 7 \\ \hline 11 \ 11 \end{array}$  24.  $\begin{array}{r} 10 \ 10 \\ - 4 \ - 6 \\ \hline 6 \ 4 \end{array}$   $\begin{array}{r} 4 \ 6 \\ + 6 \ + 4 \\ \hline 10 \ 10 \end{array}$

## Cornucopia

The horn has spilled.

Complete the equations.



- |  |  |  |
|--|--|--|
| 1. $11 - \begin{array}{c} 2 \\ \text{pumpkin} \end{array} = 9$ | 2. $\begin{array}{c} 10 \\ \text{pumpkin} \end{array} - 6 = 4$ | 3. $7 + 3 = \begin{array}{c} 10 \\ \text{pumpkin} \end{array}$ |
| 4. $5 + \begin{array}{c} 5 \\ \text{pumpkin} \end{array} = 10$ | 5. $10 - 2 = \begin{array}{c} 8 \\ \text{pumpkin} \end{array}$ | 6. $\begin{array}{c} 10 \\ \text{pumpkin} \end{array} - 8 = 2$ |
| 7. $\begin{array}{c} 9 \\ \text{pumpkin} \end{array} + 2 = 11$ | 8. $11 - \begin{array}{c} 5 \\ \text{pumpkin} \end{array} = 6$ | 9. $11 - \begin{array}{c} 4 \\ \text{pumpkin} \end{array} = 7$ |

23

## Assigning the Practice

Minimum: 1-21

Average: 1-24

Enriched: 1-24

## Reinforcement

1. Assign *Cornucopia*, page 23. Review the parts of an equation. Stress the balancing nature of the equals sign.

2. Tape the domino-like cards on the chalkboard. Allow the children to write fact families in coloured chalk.

3. Use small stationery boxes with transparent plastic lids to construct fact family devices for 10 and 11. Tape a cardboard ridge across the centre of each box and put 10 or 11 beans in each box. Have children shake the boxes and record the four related facts from the resulting arrangements.



$$5 + 6 = 11 \quad 11 - 6 = 5$$

$$6 + 5 = 11 \quad 11 - 5 = 6$$

## Enrichment

1. Ask the students to discover which fact families have only two members.

$$\begin{array}{l} 2 + 2 = 4 \\ 4 - 2 = 2 \end{array}$$

$$\begin{array}{l} 3 + 3 = 6 \\ 6 - 3 = 3 \end{array}$$

2. Pose these tricky questions: "A farmer's wife had eleven ears of corn. All but nine were eaten. How many ears were left?" (9) "How can a blueberry be turned into an autumn vegetable?" (*Squash it.*) "How can a squash be turned into a small fruit?" (*Berry it.*)

## Extra Practice

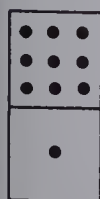
## Worksheet A5

Pages 22-23

Subtract.

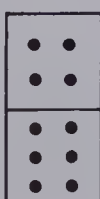
- |                          |                             |                              |
|--------------------------|-----------------------------|------------------------------|
| $11 - 2 = \underline{9}$ | 2. $11 - 3 = \underline{8}$ | 3. $11 - 8 = \underline{3}$  |
| $11 - 4 = \underline{7}$ | 5. $11 - 7 = \underline{4}$ | 6. $11 - 5 = \underline{6}$  |
| $11 - 9 = \underline{2}$ | 8. $11 - 6 = \underline{5}$ | 9. $11 - 1 = \underline{10}$ |

Write the fact family for each.



$$\begin{array}{l} 9 + 1 = 10 \\ 1 + 9 = 10 \\ 10 - 1 = 9 \\ 10 - 9 = 1 \end{array}$$

11.



$$\begin{array}{l} 4 + 6 = 10 \\ 6 + 4 = 10 \\ 10 - 6 = 4 \\ 10 - 4 = 6 \end{array}$$

## Objective A6

Subtract 1 and 10 and count back by ones and tens.

## Introducing the Lesson

Use boxes of ten crayons to review place value concepts to ninety-nine. For example, 26 is represented by two boxes of ten and 6 loose crayons. Ask the children to make similar models of other numerals. Discuss the model for 36 on page 24.

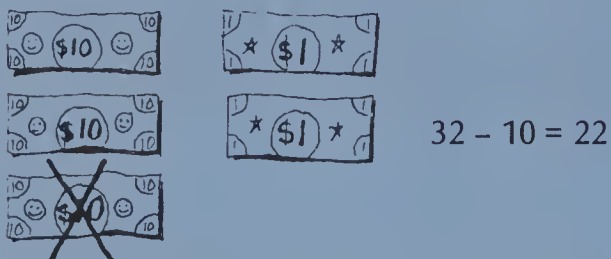
## Teaching the Lesson

Illustrate a 2-digit numeral with play money (ten dollar and one dollar bills). Take away one dollar. Draw a picture and write the equation on the chalkboard.



Discuss other examples of subtracting one from a 2-digit numeral including those pictured on page 24. Then practise **counting back by ones** from 2-digit numerals.

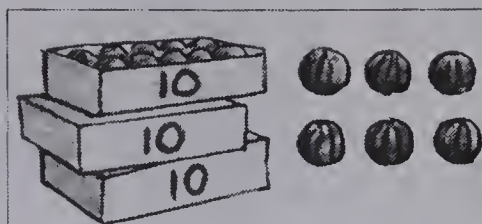
Use crayon boxes and play money to illustrate a 2-digit numeral. **Subtract ten** from it. Draw a picture and write the equation on the chalkboard.



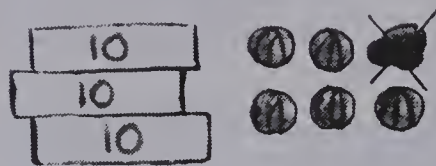
Read and discuss the examples of *less 10* on page 24. Illustrate several examples of a 2-digit numeral *minus ten*. Ask the children to **count back by tens** from 2-digit numerals.

# One Less and Ten Less

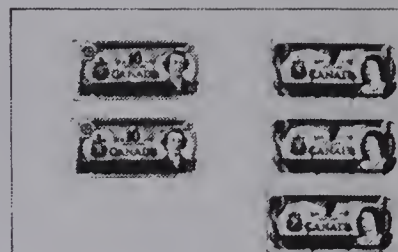
Jim wants to buy 36 squash. He has 23 dollars.



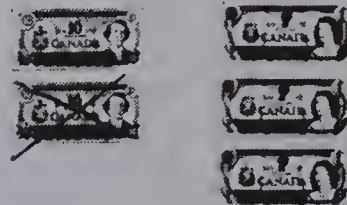
One squash spoils.  
35 good squash are left.



$$36 - 1 = 35$$

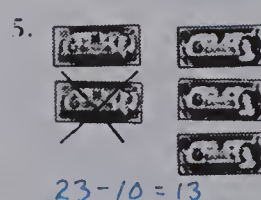
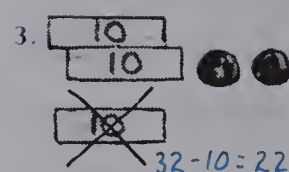
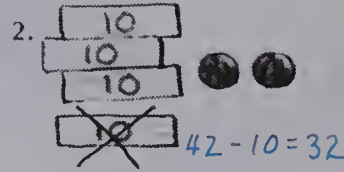
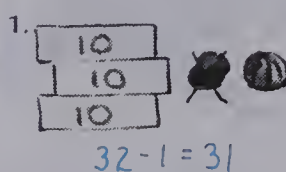


Jim spent 10 dollars.  
13 dollars are left.



$$23 - 10 = 13$$

Write the subtraction equation.



24

## Using the Exercises

- Questions 1 to 6 picture a subtraction of one or ten from a 2-digit numeral. The proper equation is required. Check that the students notice that sometimes a ten is crossed out and at other times a one is crossed out.



## Practice

Subtract

1.  $36 - 1 = 35$
2.  $25 - 1 = 24$
3.  $17 - 1 = 16$
4.  $84 - 1 = 83$
5.  $36 - 10 = 26$
6.  $25 - 10 = 15$
7.  $17 - 10 = 7$
8.  $84 - 10 = 74$
9.  $42 - 10 = 32$
10.  $63 - 1 = 62$
11.  $59 - 10 = 49$
12.  $98 - 1 = 97$
13.  $9 - 1 = 8$
14.  $19 - 10 = 9$
15.  $12 - 10 = 2$
16.  $51 - 1 = 50$

Look for the pattern. Keep counting!

17.	16	15	14	13	12	11	10	9	8	7
18.	88	87	86	85	84	83	82	81	80	79
19.	92	82	72	62	52	42	32	22	12	2
20.	96	86	76	66	56	46	36	26	16	6
21.	3	13	23	33	43	53	63	73	83	93
22.	90	81	72	63	54	45	36	27	18	9

## Assigning the Practice

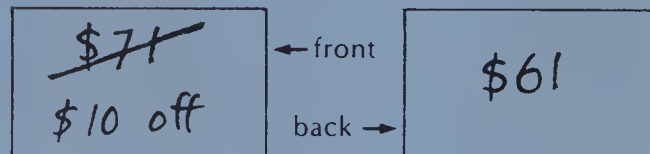
Minimum: 1-16

Average: 5-21

Enriched: 5-22

## Reinforcement

1. Prepare self-checking sales tags showing either \$10 off or \$1 off. Use as flash cards.



2. Prepare a dot-to-dot game that uses subtracting by 1 and 10 problems. Set up the problems in such a way that the students are counting forward by ones as they follow the dots. For example: 11 - 10, 3 - 1, 13 - 10, 5 - 1, 10 - 5, 16 - 10, 10 - 3, 18 - 10, 10 - 1, 20 - 10, 12 - 1, 22 - 10.

## Enrichment

1. Assign 3 Rs: Reading, wRiting, and aRithmetic on page 25. As a follow-up, have a traditional team spelling and reading bee to practise the number words from 0 to 99. Vary the difficulty of questions according to the ability of each student. Points are earned for correct responses.

2. Have the students try other number patterns based on adding and subtracting tens and ones. Complete these patterns.

a. 0, 10, 9, 19, 18, 28, 27, 37, 36.

b. 1, 12, 23, 34, 45, 56, 67, 78, 89.

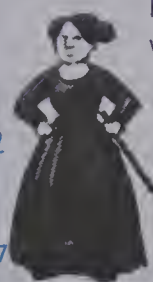
c. 0, 1, 11, 12, 22, 23, 33, 34, 44.

## 3 Rs: Reading, wRiting, and aRithmetic

Read the words.

Write the numeral.

1. thirty-one 31
2. twenty-two 22
3. 21
4. 32
5. forty-six 46
6. fifty-three 53
7. 56
8. 43
9. sixty-eight 68
10. seventy-seven 77
11. 78
12. 67
13. ninety-eight 98
14. eighty-nine 89
15. 99
16. 88



Read the numeral

Write the words

## Extra Practice

## Worksheet A6

Pages 24-25

Subtract.

1.  $91 - 10 = 81$
2.  $91 - 1 = 90$
3.  $82 - 10 = 72$
4.  $84 - 1 = 83$
5.  $67 - 1 = 66$
6.  $67 - 10 = 57$
7.  $53 - 1 = 52$
8.  $53 - 10 = 43$
9.  $48 - 10 = 38$
10.  $48 - 1 = 47$

Count backward using the same pattern.

95, 94, 93, 92, 91, 90, 89, 88, 87

95, 85, 75, 65, 55, 45, 35, 25, 15

84, 74, 64, 54, 44, 34, 24, 14, 4

# UNIT 2 LESSON 3

## Objective A7

Subtract 9 and subtract using doubles to 18.

## Introducing the Lesson

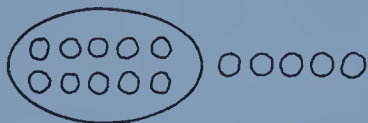
Place the following subtraction doubles on the chalkboard.

$\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$	$\begin{array}{r} 14 \\ - 7 \\ \hline 7 \end{array}$	$\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$	$\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$	$\begin{array}{r} 20 \\ - 10 \\ \hline 10 \end{array}$
--	--	--	--	--

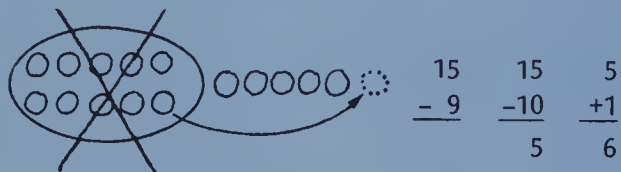
Review the idea of doubles. Then ask the children to name the related addition fact for each. (12 - 6 = 6 is related to 6 + 6 = 12.) Note that these *fact families* have only two members.

## Teaching the Lesson

Review the easy way to add nine given on page 10. Explain that there is also an easy way to subtract 9. Using the subtraction 15 - 9, show 15 as one ten and five ones.



Demonstrate how to take away nine by crossing out the ten and adding one.



Do several examples with a model and several without a model.

17 - 9 Think:  $17 - 10 = 7$   
 Subtract ten.  $7 + 1 = 8$   
 Add one.

Gradually work toward having the children think more of *adding one*.

$7 + 1 = 8$  so  $17 - 9 = 8$

Guide the children to build fact families from domino-like models which include nine.

$9 + 7 = 16$   $16 - 9 = 7$

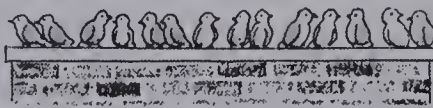
$7 + 9 = 16$   $16 - 7 = 9$



Review the facts including subtracting 9 and doubles to 18 with flash cards.

# Subtraction Comics

## 9 Less

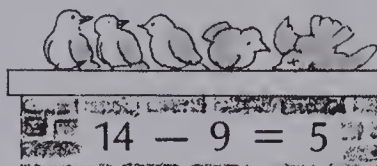


14 birds sit on a wall.



10 start south but one bird falls.

9 are gone and 5 remain.



$$14 - 9 = 5$$

Let us fly this by again.

$$\begin{array}{r} 14 \\ - 9 \\ \hline \end{array}$$

Take away 10.

Then add 1.

$$\begin{array}{r} 14 \quad 4 \\ - 10 \quad + 1 \\ \hline 4 \quad 5 \end{array}$$

Think

$$\begin{array}{r} 14 \\ - 9 \\ \hline 5 \end{array}$$

## Doubles Bubbles

$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$	$\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$	$\begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array}$	$\begin{array}{r} 14 \\ - 7 \\ \hline 7 \end{array}$	$\begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array}$	$\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$	$\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array}$	$\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$	$\begin{array}{r} 10 \\ + 10 \\ \hline 20 \end{array}$	$\begin{array}{r} 20 \\ - 10 \\ \hline 10 \end{array}$
--	--	--	--	--	--	--	--	--	--

## EXERCISES

Add and subtract.

1. $\begin{array}{r} 15 \\ - 10 \\ \hline 5 \end{array}$	$\begin{array}{r} 5 \\ + 1 \\ \hline 6 \end{array}$	$\begin{array}{r} 15 \\ - 9 \\ \hline 6 \end{array}$	2. $\begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array}$	$\begin{array}{r} 12 \\ - 9 \\ \hline 3 \end{array}$	3. $\begin{array}{r} 8 \\ + 1 \\ \hline 9 \end{array}$	$\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$
4. $\begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array}$	$\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$	5. $\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$	$\begin{array}{r} 10 \\ - 5 \\ \hline 5 \end{array}$	6. $\begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array}$	$\begin{array}{r} 14 \\ - 7 \\ \hline 7 \end{array}$	

26

## Using the Exercises

- Question 1 shows the thinking steps in subtracting nine: subtract ten and add one. Questions 2 and 3 stress the final step, adding one.
- Questions 4, 5, and 6 include three doubles fact families. See the children watch the operation signs.



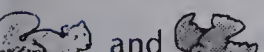

# PRACTICE

Subtract.


1.  $13 - 9 = 4$
2.  $14 - 7 = 7$
3.  $12 - 9 = 3$
4.  $15 - 9 = 6$
5.  $17 - 9 = 8$
6.  $10 - 5 = 5$
7.  $18 - 9 = 9$
8.  $16 - 9 = 7$
9.  $16 - 8 = 8$
10.  $14 - 9 = 5$
11.  $12 - 6 = 6$
12.  $20 - 10 = 10$

For each give the 4 related facts.


13.  $12 - 9 = 3$ ,  $12 - 3 = 9$ ,  $9 - 3 = 6$ ,  $3 - 6 = 9$
14.  $11 - 9 = 2$ ,  $11 - 2 = 9$ ,  $9 - 2 = 7$ ,  $2 - 7 = 9$
15.  $14 - 9 = 5$ ,  $14 - 5 = 9$ ,  $9 - 5 = 4$ ,  $5 - 4 = 9$
16.  $16 - 9 = 7$ ,  $16 - 7 = 9$ ,  $9 - 7 = 2$ ,  $7 - 2 = 9$
17.  $15 - 9 = 6$ ,  $15 - 6 = 9$ ,  $9 - 6 = 3$ ,  $6 - 3 = 9$
18.  $17 - 9 = 8$ ,  $17 - 8 = 9$ ,  $9 - 8 = 1$ ,  $8 - 1 = 9$

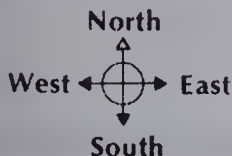
 and  look for a lost acorn. Who ends up closer to the nut?

## TWO BIRDBRAINS

 PATH  
4 spaces south  
8 east  
3 south  
5 west  
2 north  
2 east

1	2	3	4	5	6	7	8
10	11	12	13	14	15	16	17
20	21	22	23	24	25	26	27
30	31	32	33	34	35	36	37
40	41	42	43	44	45	46	47
50	51	52	53	54	55	56	57
60	61	62	63	64	65	66	67
70	71	72	73	74	75	76	77
80	81	82	83	84	85	86	87
90	91	92	93	94	95	96	97

 PATH  
8 spaces south  
9 west  
7 north  
6 east  
3 south  
2 west



Bird is closer.

27

## Assigning the Practice

Minimum: 1-15

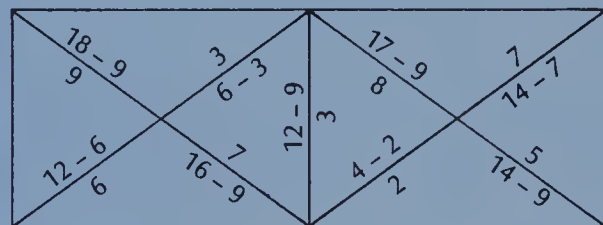
Average: 1-18

Enriched: 1-18

## Reinforcement

1. With a tape recorder, devise several memory stretching exercises. For example, record: "16 - 8 = 8" (pause for child to repeat), "16 - 8 = 8, 12 - 6 = 6" (longer pause for repetition); "16 - 8 = 8, 12 - 6 = 6, 20 - 10 = 10" (still longer pause); etc.

2. Have the children cut out this puzzle and then paste it together again on paper.



## Enrichment

1. To prepare the children for *Two Birdbrains* on page 27, discuss the four compass directions and try this gym activity.

Assemble the class in the middle of the gym and shout out, "West!" The last two students to run to the west wall are eliminated. Shout out another direction. Sometimes shout out the direction for the wall at which the children are standing and eliminate the students who move. Play continues until only one child remains in the game.

2. Assign *Two Birdbrains* on page 27. Have the children orient their books so the North indicator points North. Ask them to write down the numbers in each path to prevent guessing.

## Extra Practice

## Worksheet A7

Pages 26-27

What is Tammy making in the Fall?

- 9 - 0 = 9
- 13 - 9 = 4
- 9 - 9 = 0
- 12 - 6 = 6
- 14 - 7 = 7
- 11 - 9 = 2
- 10 - 9 = 1

- 14 - 9 = 5
- 7 - 7 = 0
- 9 - 8 = 1
- 17 - 9 = 8

Code	0	1	2	3	4	5	6	7	8	9
	I	R	E	F	W	B	N	T	D	A

- 12 - 9 = 3
- 7 - 5 = 2
- 9 - 7 = 2
- 16 - 8 = 8
- 8 - 6 = 2
- 8 - 7 = 1

## Objective M3

Experience the importance of 10 in the metric system by estimating and measuring lengths in decimetres and centimetres.

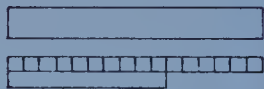
## Introducing the Lesson

Introduce the **decimetre** as a standard unit of length. Make masking tape line segments of exact lengths (3 dm, 6 dm, or 9 dm). Tape these to the floor or wall and let the children estimate and measure these lengths using decimetre strips. Show the children how to use the symbol **dm**.

## Teaching the Lesson

This lesson will require several days. With centimetre strips, measure a cardboard section that is 16 cm long. Record 16 cm on the chalkboard. Now try to measure the cardboard with only decimetre strips. Show that one can get an exact measurement by placing a 1 dm strip and a 6 cm strip alongside the section. Write the combination, 1 dm + 6 cm, and then the equation, 1 dm + 6 cm = 16 cm, on the chalkboard.

$$1 \text{ dm} + 6 \text{ cm} = 16 \text{ cm}$$



Repeat this procedure with several cardboard sections until the students discover that **1 dm = 10 cm**. Relate this to the equation 1 ten = 10 ones.

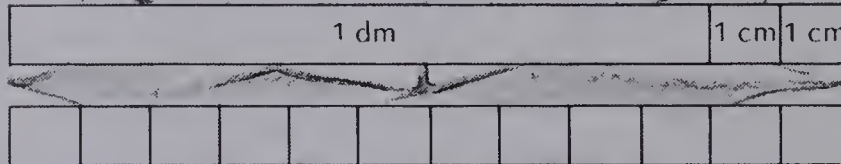
Read and discuss the lesson example at the top of page 28 noting the decimetre and centimetre measures. Have the students work in pairs to measure objects on or near their desks (a piece of paper, a book, and a floor tile) with decimetre and centimetre strips. Discuss the *length* and *width* of the object and have these two dimensions measured using the following procedure.

1. Place a centimetre strip alongside the length or width, then count and write the number of centimetres used (e.g., 42 cm).
2. Trade each set of 10 cm for a 1 dm strip.
3. Write the equation showing the total decimetres and centimetres used. (4 dm + 2 cm = 42 cm).

# Decimetre and Centimetre Strips

one decimetre

Use **dm** for decimetre.  
1 dm = 10 cm



1 dm + 2 cm equals 12 cm

1 dm + 6 cm = 16 cm    2 dm + 3 cm = 23 cm    3 dm = 30 cm

## EXERCISES

Measure these strips.

1. 14 cm
2. 11 cm
3. 13 cm

Complete the equations.

4. 1 dm + 7 cm = 17 cm
5. 2 dm + 7 cm = 27 cm
6. 6 dm + 7 cm = 67 cm
7. 2 dm + 4 cm = 24 cm
8. 5 dm + 4 cm = 54 cm
9. 9 dm + 4 cm = 94 cm
10. 2 dm + 6 cm = 26 cm
11. 2 dm + 9 cm = 29 cm
12. 4 dm = 40 cm
13. 7 dm = 70 cm
14. 9 dm = 90 cm

## Using the Exercises

- Questions 1 to 3 give added practice in measuring line segments. The students can use decimetre and centimetre strips or a centimetre ruler for this.
- Questions 4 to 14 ask the student to rewrite decimetres as centimetres and vice versa.



## PRACTICE

Complete the equations.

- $5 \text{ dm} + 4 \text{ cm} = \text{54 cm}$
- $3 \text{ dm} + 7 \text{ cm} = 37 \text{ cm}$
- $9 \text{ dm} + 3 \text{ cm} = \text{93 cm}$
- $2 \text{ dm} + \text{5 cm} = 25 \text{ cm}$
- $5 \text{ dm} = \text{50 cm}$
- $5 \text{ dm} + 2 \text{ cm} = 52 \text{ cm}$
- $8 \text{ dm} + \text{2 cm} = 82 \text{ cm}$
- $6 \text{ dm} = 60 \text{ cm}$

9. Copy and complete the table.

	ESTIMATE	MEASURE
length of my book	dm	$2 \text{ dm} + 4 \text{ cm} = \text{24 cm}$
width of my book	dm	$1 \text{ dm} + 9 \text{ cm} = \text{19 cm}$
length of my desk	dm	$\text{ dm} + \text{ cm} = \text{ cm}$
width of my desk	dm	$\text{ dm} + \text{ cm} = \text{ cm}$

10. Put these in a large picture. Use a centimetre ruler

- a tree 17 cm tall      a road 29 cm long      a car 1 dm long  
a fence 21 cm long      a truck 11 cm tall      a bird 5 cm wide

## REVIEW

Subtract

- |    |  |  |   |  |  |
|----|--|--|---|--|--|
| A5 | 1. $\begin{array}{r} 10 \\ - 6 \\ \hline 4 \end{array}$  | 2. $\begin{array}{r} 11 \\ - 5 \\ \hline 6 \end{array}$  | 3. $\begin{array}{r} 10 \\ - 3 \\ \hline 7 \end{array}$   | 4. $\begin{array}{r} 11 \\ - 7 \\ \hline 4 \end{array}$  | 5. $\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$    |
| A6 | 6. $\begin{array}{r} 17 \\ - 10 \\ \hline 7 \end{array}$ | 7. $\begin{array}{r} 17 \\ - 1 \\ \hline 16 \end{array}$ | 8. $\begin{array}{r} 24 \\ - 10 \\ \hline 14 \end{array}$ | 9. $\begin{array}{r} 24 \\ - 1 \\ \hline 23 \end{array}$ | 10. $\begin{array}{r} 98 \\ - 10 \\ \hline 88 \end{array}$ |
| A7 | 11. $\begin{array}{r} 14 \\ - 9 \\ \hline 5 \end{array}$ | 12. $\begin{array}{r} 12 \\ - 9 \\ \hline 3 \end{array}$ | 13. $\begin{array}{r} 17 \\ - 9 \\ \hline 8 \end{array}$  | 14. $\begin{array}{r} 14 \\ - 7 \\ \hline 7 \end{array}$ | 15. $\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$   |

29

## Assigning the Practice

Minimum: 1-8

Average: 1-9

Enriched: 1-10

## Review Exercises

Questions	Objective	Pages
1-5	A5	22-23
6-10	A6	24-25
11-15	A7	26-27

## Reinforcement

1. Prepare a different paper rectangle for each of your students. Number each rectangle. Have the students first estimate and then measure the lengths and widths using decimetre and centimetre strips. Ask the students to record their answers either in exact decimetres and centimetres or in equations.

Rectangle Number	Length	Width
1	5 dm	$2 \text{ dm} + 6 \text{ cm} = 26 \text{ cm}$
2	$1 \text{ dm} + 2 \text{ cm} = 12 \text{ cm}$	3 dm

2. Use decimetre and centimetre strips for counting forward or back by ones and tens. Especially stress the trading required at each new ten.

## Enrichment

1. For a measuring activity similar to the Reinforcement activity, use large paper triangles and measure perimeters instead. Have the children record the addition of the three sides and then regroup the centimetres for decimetres as needed.

Triangle 1



$1 \text{ dm} + 4 \text{ cm}$   
Sides:  $2 \text{ dm} + 9 \text{ cm}$   
 $1 \text{ dm} + 6 \text{ cm}$

$4 \text{ dm} + 19 \text{ cm}$   
or

Perimeter  $5 \text{ dm} + 9 \text{ cm}$

2. Have the students collect and mount coloured leaves, measure each, and display them.

# UNIT 2 LESSON 5

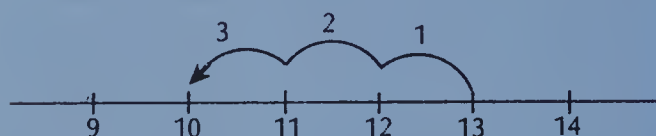
## Objective A8

Subtract from 12 and 13 by counting back strategies.

## Introducing the Lesson

Practise counting back by ones to zero from 18, 15, 13, and 12. Use the number line to demonstrate counting back to subtract as shown in this example.

“Count back three.”  $13 - 3 = 10$



To help the children avoid the common error of *counting in place*, that is, of saying the 13 when starting to count back, have the children illustrate the example by hopping on a floor number line. Try several other counting back examples from 12 and 13.

## Teaching the Lesson

It may take two days to discuss adequately the subtraction techniques developed in this lesson.

Discuss the example,  $13 - 6 = 7$ , at the top of page 30. Note that from 13 back to 7 there are 6 spaces, or hops. Then ask the children to show their hands with 6 fingers outstretched. As you point to each hop on the number line, the children count aloud, “12, 11, 10, 9,...,” and tap their fingers on their desks for each number. Try several more examples with the number line and several without it. For example, for  $12 - 5$ , the children show five fingers and count back 5 from 12, “11, 10, 9, 8, 7.”

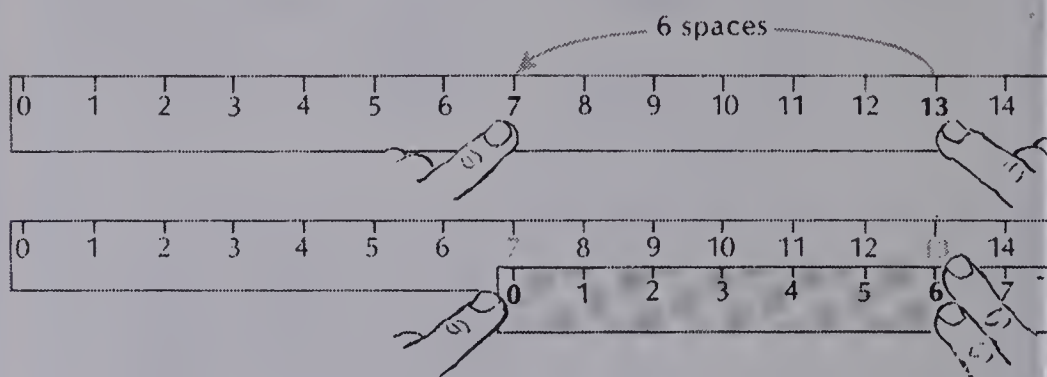
Demonstrate the subtraction machine (two centimetre rulers) on page 30. Show  $13 - 6 = 7$  by taking a second ruler and placing it underneath the first as shown on the page. With the 6 below the 13, the zero will be below the answer. Discuss several other examples.

Show addition fact cards with sums to 12 and 13. Have the students give the two related subtraction equations.

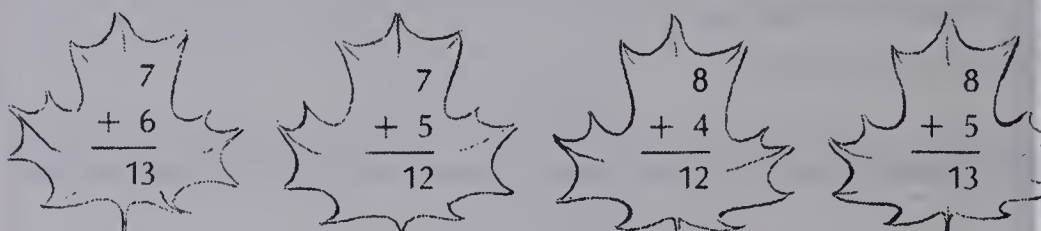
# Subtracting from 12 and 13

Subtraction helpers can be handy.

$$13 - 6 = 7$$



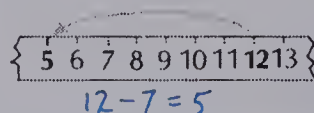
Don't leave these out!



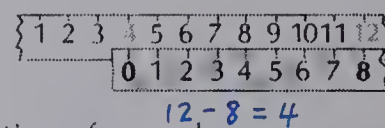
## EXERCISES

Give the subtraction equations.

1.



2.



Give two related subtraction equations for each:

3.

$$\begin{array}{r} 7 \quad 13 \quad 13 \\ + 6 \quad -6 \quad -7 \\ \hline 13 \quad 7 \quad 6 \end{array}$$

4.

$$\begin{array}{r} 7 \quad 12 \quad 12 \\ + 5 \quad -7 \quad -5 \\ \hline 12 \quad 5 \quad 7 \end{array}$$

5.

$$\begin{array}{r} 8 \quad 12 \quad 12 \\ + 4 \quad -8 \quad -4 \\ \hline 12 \quad 4 \quad 8 \end{array}$$

6.

$$\begin{array}{r} 8 \quad 13 \\ + 5 \quad -8 \\ \hline 13 \quad 5 \end{array}$$

30

## Using the Exercises

- Question 1 gives a number line. The student must write the subtraction equation.
- Question 2 uses a subtraction machine.
- Questions 3 to 6 ask the student to write the two subtraction facts related to the given addition fact.



## PRACTICE

Subtract.

1.  $\begin{array}{r} 13 \\ - 7 \\ \hline 6 \end{array}$
2.  $\begin{array}{r} 13 \\ - 6 \\ \hline 7 \end{array}$
3.  $\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$
4.  $\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$
5.  $\begin{array}{r} 13 \\ - 8 \\ \hline 5 \end{array}$
6.  $\begin{array}{r} 13 \\ - 5 \\ \hline 8 \end{array}$
7.  $\begin{array}{r} 12 \\ - 4 \\ \hline 8 \end{array}$
8.  $\begin{array}{r} 12 \\ - 8 \\ \hline 4 \end{array}$
9.  $\begin{array}{r} 13 \\ - 4 \\ \hline 9 \end{array}$
10.  $\begin{array}{r} 13 \\ - 9 \\ \hline 4 \end{array}$
11.  $\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$
12.  $\begin{array}{r} 12 \\ - 9 \\ \hline 3 \end{array}$

Copy and complete the tables.

13.

—	4	6	7	5	8
12	8	6	5	7	4

14.


—	4	6	8	5	7
13	9	7	5	8	6

## Handy Table

An addition table can help you subtract.

$$13 - 6$$

Put your finger on 6.  
Slide to 13.  
Look up and see 7.



+	5	6	7	8	9
5	10	11	12	13	14
6	11	12	13	14	15
7	12	13	14	15	16
8	13	14	15	16	17
9	14	15	16	17	18

Use the table to subtract.

1.  $\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$
2.  $\begin{array}{r} 13 \\ - 5 \\ \hline 8 \end{array}$
3.  $\begin{array}{r} 17 \\ - 9 \\ \hline 8 \end{array}$
4.  $\begin{array}{r} 15 \\ - 7 \\ \hline 8 \end{array}$
5.  $\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array}$
6.  $\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$

31

## Extra Practice

Use the code to get a message.

3	4	5	6	7	8	9
A	D	H	N	P	S	Y

1.  $\begin{array}{r} 13 \\ - 8 \\ \hline \end{array}$  **H**<sup>5</sup>
2.  $\begin{array}{r} 12 \\ - 9 \\ \hline \end{array}$  **A**<sup>3</sup>
3.  $\begin{array}{r} 13 \\ - 7 \\ \hline \end{array}$  **N**<sup>6</sup>
4.  $\begin{array}{r} 12 \\ - 8 \\ \hline \end{array}$  **D**<sup>4</sup>
5.  $\begin{array}{r} 13 \\ - 4 \\ \hline \end{array}$  **Y**<sup>9</sup>

6.  $\begin{array}{r} 13 \\ - 5 \\ \hline \end{array}$  **S**<sup>8</sup>
7.  $\begin{array}{r} 12 \\ - 5 \\ \hline \end{array}$  **P**<sup>7</sup>
8.  $\begin{array}{r} 13 \\ - 10 \\ \hline \end{array}$  **A**<sup>3</sup>
9.  $\begin{array}{r} 12 \\ - 6 \\ \hline \end{array}$  **N**<sup>6</sup>
10.  $\begin{array}{r} 12 \\ - 8 \\ \hline \end{array}$  **D**<sup>4</sup>
11.  $\begin{array}{r} 12 \\ - 3 \\ \hline \end{array}$  **Y**<sup>9</sup>

## Worksheet A8

Pages 30-31

## Assigning the Practice

Minimum: 1-12

Average: 1-14

Enriched: 1-14

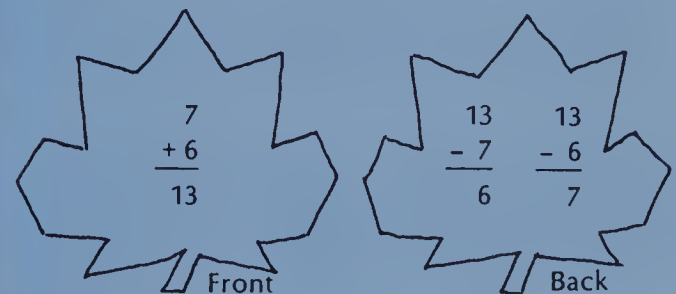
## Reinforcement

1. Point out the *Handy Table* on page 31 and explain how it can be used to subtract. Try several examples using the suggested procedure before assigning the six subtractions.

2. Play the "Handy Spandy" game. On cardboard draw a number line from 0 to 20 leading to a grocer's shop. Mark a die with the numbers 1, 2, 5, 6, 7, 8 on the faces. Each player gets 3 markers (Handy Spandy, Plum Cake, and Sugar Candy). At the start of the game, all the markers are placed in the grocer's shop. The object of the game is to be the first player to move three markers to the zero square. The players take turns rolling the die and move their markers along the number line the number of spaces indicated on the die.

Handy Spandy, Jack-a-dandy  
Loved plum cake and sugar candy;  
He bought some at a grocer's shop,  
And out he came, hop, hop, hop.

3. Provide leaf templates and let the children make memory leaves for the related facts they find most difficult.



## Enrichment

1. Have a subtraction fact contest between:

- a. a calculator team
- b. a subtraction machine team
- c. an addition table team
- d. a memory team

2. Have the children invent a subtraction game about falling leaves after discussing this Emily Brontë poem.

Fall, leaves, fall; die, flowers away;  
Lengthen night and shorten day;  
Every leaf speaks bliss to me,  
Fluttering from the autumn tree.

## Objective N2

Read and use ordinals and dates to the thirty-first (31st).

## Introducing the Lesson

Place 31 objects along a chalk tray. Number them on the chalkboard as they are, in order (1, 2, 3, ...). Explain that ordinal numbers are used to describe things *in order*. Change each cardinal number on the board to an ordinal number (1 becomes 1st, 2 becomes 2nd, etc.). Say each ordinal number, pointing out the different endings.

## Teaching the Lesson

Make the ordinal number jigsaw puzzle shown below. Have the class read through all of the ordinal words. Let the children place the words beside the objects in the chalk tray.

front: 1st 2nd 3rd 4th ...  
back: first second third fourth ...

Read the poem *Autumn's Orders* on page 32 together. Discuss the order of autumn's events. Relate the exercises to the poem.

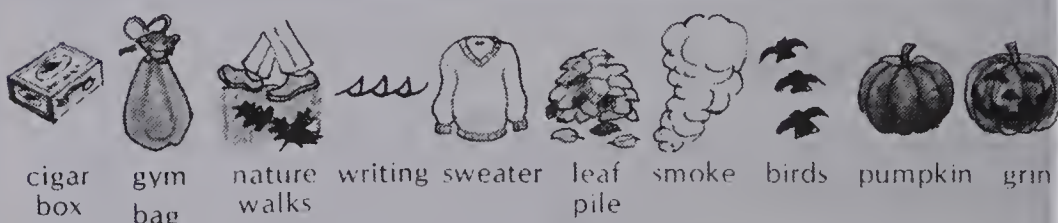
Another approach to introducing ordinal numbers would be to line the children up in a row and have them count and hold a cardinal numeral as you go down the row (cardinal numbers: 1, 2, 3, ...). Then suppose they were to leave the room for recess, fire drill, a drink, etc. The child closest to the door would be first to go, the next one second, and so on. Change each of their cardinal numerals for an ordinal numeral (perhaps it could be written on the reverse of the card). Stress that *ordinal* numerals relate to *order*.

Ask students for examples of where ordinal numerals could be used, that is, examples where the order of the items is important.

# Ordinal Numbers

## Autumn's Orders

- **First**, a cigar box for pencils and candy.
- Gym bag is **second**, a small one is dandy.
- **Third**, nature walks and friendly play-fighting
- Strengthen your arms for the **fourth**, which is writing.
- **Fifth**, some long pants and some soft woollen sweaters
- That make leafy-landings, as **sixth**, so much better.
- **Seventh**, lazy smoke stirred aloft by a rake,
- Crosses the airways that, **eighth**, the birds take.
- **Ninth** swells a pumpkin — the stoutest you've seen,
- Greeting this Autumn, as **tenth**, with a grin.



## EXERCISES

1. What is sixth? *leaf pile*
2. What is fourth? *writing*
3. What is third? *nature walks*
4. What is tenth? *grin*
5. What is fifth? *sweater*
6. What is eighth? *birds*

Complete with an ordinal number:

7. The gym bag is ■ . *2nd*
8. The smoke is ■ . *7th*
9. The pumpkin is ■ . *9th*
10. The cigar box is ■ . *1st*
11. The sweater is ■ . *5th*
12. The birds are ■ . *8th*

## Using the Exercises

- Questions 1 to 6 give an ordinal number word; the student should find the correct object from those pictured on the page.
- Questions 7 to 12 reverse the procedure ; an object is given and the response should be the ordinal number word. Each of the ordinals needed to answer these questions is correctly spelled at the top of the page.



## PRACTICE

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Which letter?

1. thirteenth <sup>M</sup>
2. twenty-sixth <sup>Z</sup>
3. ninth <sup>I</sup>
4. nineteenth <sup>S</sup>
5. twenty-first <sup>U</sup>
6. fifteenth <sup>O</sup>
7. twenty-fourth <sup>X</sup>
8. twelfth <sup>L</sup>

Which ordinal number?

9. K <sup>11th</sup>
10. N <sup>14th</sup>
11. Q <sup>17th</sup>
12. V <sup>22nd</sup>
13. W <sup>23rd</sup>
14. Y <sup>25th</sup>

## From Grandpa's Attic



Give the day of the week.

1. the 3<sup>rd</sup> <sup>Thursday</sup>
2. the 18<sup>th</sup> <sup>Friday</sup>
3. the 16<sup>th</sup> <sup>Wednesday</sup>
4. the 21<sup>st</sup> <sup>Monday</sup>
5. the 22<sup>nd</sup> <sup>Tuesday</sup>
6. the 26<sup>th</sup> <sup>Saturday</sup>

Give the date

7. the first Monday <sup>7th</sup>
8. Halloween <sup>31st</sup>
9. the fourth Friday <sup>25th</sup>
10. Thanksgiving <sup>7th</sup>
11. the second Sunday <sup>13th</sup>
12. the third Tuesday <sup>15th</sup>

3. Make an October calendar for this year.

Show the special dates.

33

## Assigning the Practice

Minimum: All

Average: All

Enriched: All

## Reinforcement

1. Before assigning *From Grandpa's Attic*, page 33, tell a story about searching through a dusty attic for Halloween costumes. Have a character in your story discover an old calendar. Use the old October calendar on page 33 for such questions as:

- a. "How many Thursdays were there?"
- b. "What was the date of the fifth Thursday?"
- c. "On what day did the month begin?"
- d. "What was the date of the fourth Friday?"

2. Let the children use the ordinal number cards and the ordinal word cards as jigsaw puzzles.

3. Begin a "monster memory" daily activity which runs until Halloween. Begin the first day by drawing the outline of a face. Each evening add one more feature to the monster face. The next day ask the children what was added. Have someone recount the order in which the features were added. "First the face outline, second the right eye, third the right eye brow,...."

## Enrichment

1. Give the students practice in writing dates two ways: October 12, 1992 and 92-10-12.

2. Have the children make November and December calendars to accompany the October calendar requested on page 33.

3. Scramble the order of the national holidays on the chalkboard. Ask the children to put them in order, first, by occurrence and later, by popularity.

## Practice

## Worksheet N2

Pages 32-33

Match the ordinal numbers.

- thirteenth •
- fifteenth •
- twelfth •
- eighth •
- twentieth •
- twenty-ninth •
- 8th •
- 15th •
- 29th •
- 13th •
- 20th •
- 12th •

- 18th •
- 25th •
- 19th •
- 23rd •
- 21st •
- 22nd •
- twenty-third •
- twenty-fifth •
- twenty-second •
- eighteenth •
- twenty-first •
- nineteenth •

What is the fifth letter of the alphabet? E

What is the eleventh letter of the alphabet? K

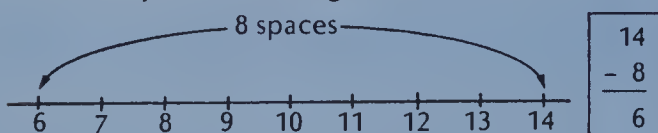
What is the twenty-sixth letter of the alphabet? Z

## Objective A9

Use *bridging with 10* for subtraction facts to 18 with emphasis on 14 through 17 facts.

## Introducing the Lesson

Using a number line, recall how  $14 - 8$  can be found by taking away (counting back) eight from fourteen. Explain that  $14 - 8$  is the **difference** between 14 and 8. Demonstrate how the difference between any two numbers can be found by subtracting.



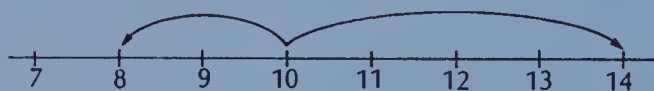
## Teaching the Lesson

Remark how important subtracting from 10 ( $10 - 2$ ,  $10 - 6$ ) and subtracting 10 ( $14 - 10$ ,  $17 - 10$ ,  $15 - 10$ ) are for this lesson.

Carefully discuss the examples on page 34 that use **bridging with tens** to find differences.

“For  $14 - 8$ , we are finding the difference between 14 and 8.”

2 spaces + 4 spaces = 6 spaces



The Mighty Ten is between 8 and 14. There are two spaces between 8 and 10 and four spaces between 10 and 14. Since  $4 + 2 = 6$ , we know  $14 - 8 = 6$ .

Gradually develop the ability to *bridge with ten* without a number line.

To do:

$$\begin{array}{r} 12 \\ - 7 \\ \hline \end{array}$$

First think:

- between 12 and 10 = 2 spaces
- between 10 and 7 = 3 spaces

Then think:

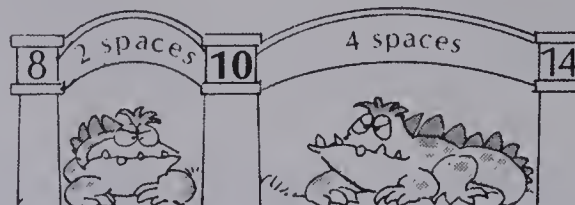
$$\begin{array}{r} 2 \\ + 3 \\ \hline 5 \end{array}$$

So:

$$\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$$

# Bridging Subtraction

We have used 10 in many subtraction equations. Let 10 help you **bridge** the subtraction dragons.

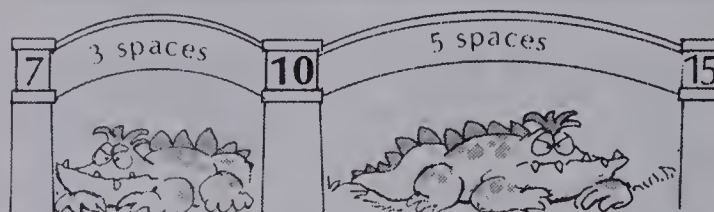


To Do

$$\begin{array}{r} 14 \\ - 8 \\ \hline \end{array}$$

Think

$$\begin{array}{r} 4 \\ + 2 \\ \hline 6 \end{array}$$



To Do

$$\begin{array}{r} 15 \\ - 7 \\ \hline \end{array}$$

Think

$$\begin{array}{r} 5 \\ + 3 \\ \hline 8 \end{array}$$

## EXERCISES

Subtract.

1. $\begin{array}{r} 10 \\ - 2 \\ \hline 8 \end{array}$	2. $\begin{array}{r} 10 \\ - 3 \\ \hline 7 \end{array}$	3. $\begin{array}{r} 10 \\ - 4 \\ \hline 6 \end{array}$	4. $\begin{array}{r} 14 \\ - 10 \\ \hline 4 \end{array}$	5. $\begin{array}{r} 15 \\ - 10 \\ \hline 5 \end{array}$	6. $\begin{array}{r} 17 \\ - 10 \\ \hline 7 \end{array}$
7. $\begin{array}{r} 14 \\ - 10 \\ \hline 4 \end{array}$	$\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$	$\begin{array}{r} 14 \\ - 8 \\ \hline 6 \end{array}$	8. $\begin{array}{r} 15 \\ - 10 \\ \hline 5 \end{array}$	$\begin{array}{r} 10 \\ - 7 \\ \hline 3 \end{array}$	$\begin{array}{r} 15 \\ - 7 \\ \hline 8 \end{array}$
9. $\begin{array}{r} 17 \\ - 10 \\ \hline 7 \end{array}$	$\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$	$\begin{array}{r} 17 \\ - 8 \\ \hline 9 \end{array}$	10. $\begin{array}{r} 14 \\ - 10 \\ \hline 4 \end{array}$	$\begin{array}{r} 10 \\ - 6 \\ \hline 4 \end{array}$	$\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array}$
11. To Do $\begin{array}{r} 14 \\ - 5 \\ \hline 9 \end{array}$	Think $\begin{array}{r} 4 \\ + 5 \\ \hline 9 \end{array}$	12. To Do $\begin{array}{r} 15 \\ - 8 \\ \hline 7 \end{array}$	Think $\begin{array}{r} 5 \\ + 2 \\ \hline 7 \end{array}$	13. To Do $\begin{array}{r} 16 \\ - 7 \\ \hline 9 \end{array}$	Think $\begin{array}{r} 6 \\ + 3 \\ \hline 9 \end{array}$

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## Using the Exercises

- Questions 1 to 3 review subtracting from 10.
- Questions 4 to 6 review subtracting 10. These are the two *bridging with ten* steps.
- Questions 7 to 10 give the two *bridging with 10* steps and then the related subtraction problem.
- Questions 11 to 13 give a subtraction problem and ask the students to do the “Think” step shown at the top of the page. Do Question 11 orally and draw a number line that represents the “Think” step.



# PRACTICE

Subtract.

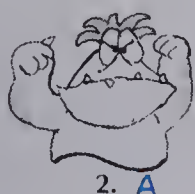
1.  $\begin{array}{r} 13 \\ - 8 \\ \hline 5 \end{array}$
2.  $\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$
3.  $\begin{array}{r} 15 \\ - 8 \\ \hline 7 \end{array}$
4.  $\begin{array}{r} 14 \\ - 7 \\ \hline 7 \end{array}$
5.  $\begin{array}{r} 14 \\ - 8 \\ \hline 6 \end{array}$
6.  $\begin{array}{r} 15 \\ - 7 \\ \hline 8 \end{array}$
7.  $\begin{array}{r} 16 \\ - 7 \\ \hline 9 \end{array}$
8.  $\begin{array}{r} 13 \\ - 6 \\ \hline 7 \end{array}$
9.  $\begin{array}{r} 17 \\ - 8 \\ \hline 9 \end{array}$
10.  $\begin{array}{r} 15 \\ - 6 \\ \hline 9 \end{array}$
11.  $\begin{array}{r} 13 \\ - 7 \\ \hline 6 \end{array}$
12.  $\begin{array}{r} 11 \\ - 6 \\ \hline 5 \end{array}$
13.  $\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array}$
14.  $\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$
15.  $\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$
16.  $\begin{array}{r} 15 \\ - 9 \\ \hline 6 \end{array}$
17.  $\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$
18.  $\begin{array}{r} 17 \\ - 9 \\ \hline 8 \end{array}$
19.  $\begin{array}{r} 14 \\ - 5 \\ \hline 9 \end{array}$
20.  $\begin{array}{r} 16 \\ - 9 \\ \hline 7 \end{array}$
21.  $\begin{array}{r} 13 \\ - 5 \\ \hline 8 \end{array}$
22.  $\begin{array}{r} 14 \\ - 9 \\ \hline 5 \end{array}$
23.  $\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$
24.  $\begin{array}{r} 13 \\ - 9 \\ \hline 4 \end{array}$
25.  $\begin{array}{r} 11 \\ - 4 \\ \hline 7 \end{array}$
26.  $\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$
27.  $\begin{array}{r} 13 \\ - 4 \\ \hline 9 \end{array}$
28.  $\begin{array}{r} 11 \\ - 2 \\ \hline 9 \end{array}$
29.  $\begin{array}{r} 12 \\ - 4 \\ \hline 8 \end{array}$
30.  $\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$

## Defeated Dragons

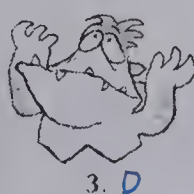
Match each dragon to the feet that fit.



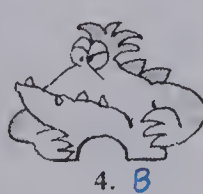
1. C



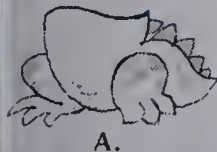
2. A



3. D



4. B



A.



B.



C.



D.

35

## Extra Practice

Complete the subtraction table.

## Worksheet A9

Pages 34-35

—	2	3	4	5	6	7	8	9
11	9	8	7	6	5	4	3	2
12	10	9	8	7	6	5	4	3
13		10	9	8	7	6	5	4
14			10	9	8	7	6	5
15				10	9	8	7	6
16					10	9	8	7
17						10	9	8
18							10	9

## Assigning the Practice

Minimum: 1-30

Average: 1-30

Enriched: 1-30

## Reinforcement

Continue the basic facts drill program by testing the students on a one-to-one basis using flash cards. Three-second recall of a basic fact indicates mastery of that fact. Children may work in pairs and test each other on fact recall. Students record their results on a subtraction Fact Master card in the following way.

1st time correct — light shading

2nd time correct — dark shading

3rd time correct — sticker

	0	1	2	3	4	5	6	7	8	9
10										
11										
12										
13										
14										
15										
16										
17										
18										

Assist students with recurring errors. Try to schedule a basic facts drill program for a time separate from your math period. Be patient—some children will require many sessions to complete the addition and subtraction quizzes, others may complete the multiplication facts as well within the same time.

Discourage competition between students of unequal abilities or skill levels. The most helpful competition is of the student with himself or herself.

## Enrichment

1. Assign *Defeated Dragons*, page 35.

2. Using the October calendar, make a set of word problem task cards requiring a comparison between dates, for example: "How many days are there from October 9 to October 17?"

**Objective PS3**

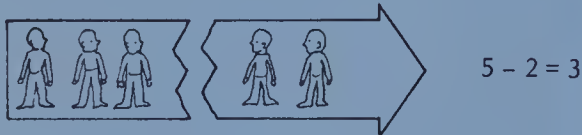
Associate word problems with appropriate concrete models, pictorial models, and equations.

**Introducing the Lesson**

Point out the pictorial models of addition and subtraction on the top of page 36. Explain that in adding there is a combining or gathering together process, while in subtracting there is a separating or taking apart process.

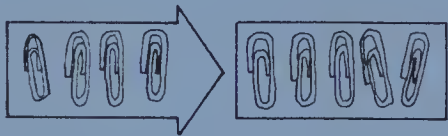
**Teaching the Lesson**

Draw arrow models of several addition and subtraction equations. As you draw each model, discuss it and have the students give the appropriate equation for it.



The process performed here necessitates thinking *from a model to an equation*.

Orally compose a word problem. Demonstrate it using concrete objects like paper clips and pencils. Write it on the chalkboard in words and guide the students in drawing an appropriate model. Then write a suitable equation.



5 paper clips  
4 paper clips more  
How many in all?

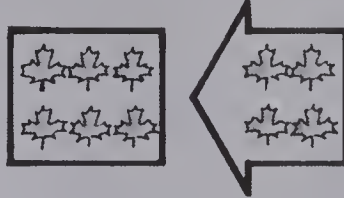
Here the process necessitates thinking *from a story problem to a model and, finally, to an equation*.

**Enrichment**

Let the children prepare word problem cards for the class. This activity may be started by listing several addition and subtraction equations from which a picture is to be drawn and then a word problem written.

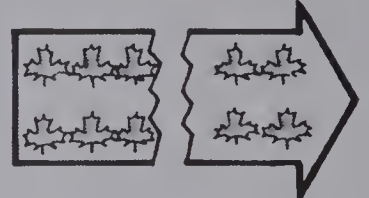
**Stories and Pictures**

For adding, think  
together or to gather.



$$6 + 4 = 10$$

For subtracting, think  
a part or to part.

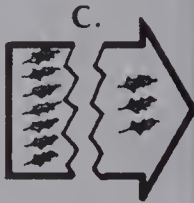
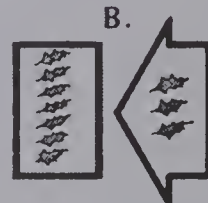
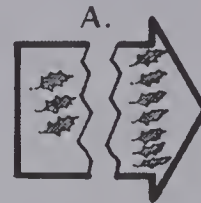


$$10 - 4 = 6$$

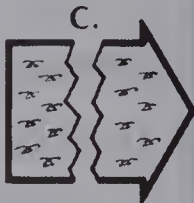
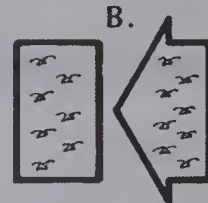
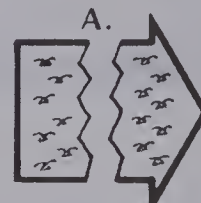
**P**ick the correct picture.

**S**how the correct equation.

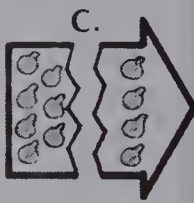
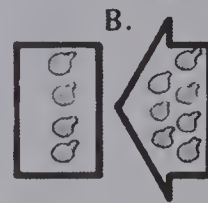
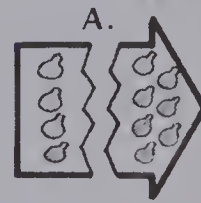
1. 10 leaves  
3 blow away.  
How many left?  
 $10 - 3 = 7$  C.



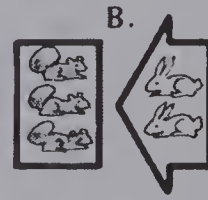
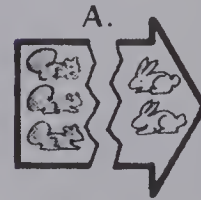
2. 7 birds  
8 more come.  
How many now?  
 $7 + 8 = 15$  B.



3. 11 squash  
4 lost  
How many now?  
 $11 - 4 = 7$  C.



4. 3 squirrels  
2 rabbits  
How many animals?  
 $3 + 2 = 5$  B.



36

**Problem Solving Activities**

Assign Level 3, Unit 2.



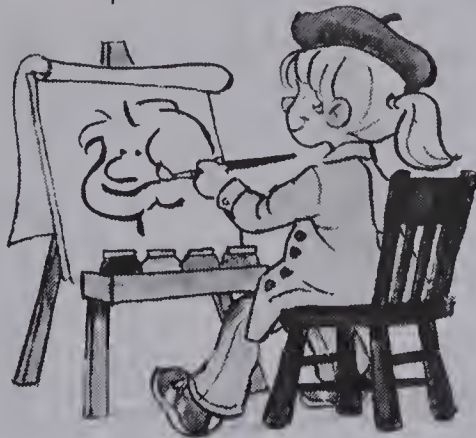
# Drawing Pictures

Draw the picture. Then give the equation.

- 14 pumpkins  
8 are carved.  
How many are not?  
 $14 - 8 = 6$

- 9 clown masks  
5 demon masks  
How many masks?  
 $9 + 5 = 14$

- 13 witches  
5 without brooms  
How many with brooms?  
 $13 - 5 = 8$



- 16 children  
8 costumes  $16 - 8 = 8$   
How many without?

**Problem Solving**

## REVIEW

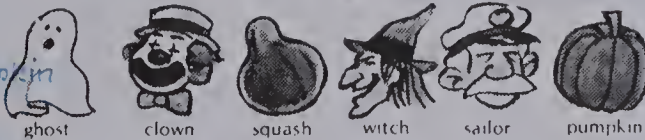
Subtract.

- |  |  |  |  |  |  |
|--|--|--|--|--|--|
| 1. 12  | 2. 13  | 3. 12  | 4. 13  | 5. 12  | 6. 13  |
| $\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$ | $\begin{array}{r} 13 \\ - 6 \\ \hline 7 \end{array}$ | $\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$ | $\begin{array}{r} 13 \\ - 4 \\ \hline 9 \end{array}$ | $\begin{array}{r} 12 \\ - 8 \\ \hline 4 \end{array}$ | $\begin{array}{r} 13 \\ - 5 \\ \hline 8 \end{array}$ |

- Who is first? *ghost*

- What is sixth? *pumpkin*

- Who is fourth? *witch*



Subtract.

- |  |  |  |  |  |  |
|--|--|--|--|--|--|
| 10. 16   | 11. 15   | 12. 14   | 13. 17   | 14. 15   | 15. 13   |
| $\begin{array}{r} 16 \\ - 7 \\ \hline 9 \end{array}$ | $\begin{array}{r} 15 \\ - 8 \\ \hline 7 \end{array}$ | $\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array}$ | $\begin{array}{r} 17 \\ - 8 \\ \hline 9 \end{array}$ | $\begin{array}{r} 15 \\ - 7 \\ \hline 8 \end{array}$ | $\begin{array}{r} 13 \\ - 6 \\ \hline 7 \end{array}$ |

37

## Objective PS4

Draw appropriate pictures not suggesting movement for addition and subtraction word problems.

## Teaching the Lesson

Display the following word problem cards. Have the students demonstrate the situations by drawing pictures and then provide the addition or subtraction equations.

12 for bobbing.  
Bill bit into 5 .  
How many not bitten?

Jim has 4 .  
Jill has 12 .  
How many more does Jill have?

6 candies from one .  
7 candies from another .  
How many candies in all?

8 candles .  
15 pumpkins .  
How many more candles are needed?

Discuss the kinds of pictures to be made and set neatness standards before assigning the page.

## Reinforcement

Prepare a seasonal word problem kit consisting of:

1. set-holder cards (for Halloween: pumpkins, paper bags, haunted houses, brooms, etc.)
2. felt or cardboard objects (black triangles, candies, apples, ghosts, witches, etc.)
3. related rebus word problem cards.

Word Problem Card

Set-Holder Card & Objects

Equation and Concluding Statement

had 6   
8 more were cut.  
How many now?



$6 + 8 = 14$   
14 cut in

The children are to illustrate the word problem on the set-holder card and then write the proper equation and concluding statement.

## Review Exercises

Questions	Objective	Pages
1-6	A8	30-31
7-9	N2	32-33
10-15	A9	34-35

## Extra Practice

## Worksheet PS3-PS4

Pages 36-37

Draw the picture. Solve the problem.

- 7 maple leaves  
3 oak leaves  
How many leaves? *10*

- 11 candles  
7 are lit.  
How many are not? *4*

- 15 children  
8 masks  
How many bare faces? *7*

- 5 pumpkin pies  
9 apple pies  
How many pies? *14*

Unit 2 Objective	Test Questions	Pages
A5	1-5	22-23
A6	6-10	24-25
A7	11-15	26-27
M3	16-17	28-29
A8	18-22	30-31
N2	23-24	32-33
A9	25-29	34-35
PS	30-31	

# TEST

# UNIT 2

Subtract.

- |  |  |  |   |  |
|--|--|--|---|--|
| 1. $\begin{array}{r} 10 \\ - 7 \\ \hline 3 \end{array}$  | 2. $\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$  | 3. $\begin{array}{r} 11 \\ - 4 \\ \hline 7 \end{array}$  | 4. $\begin{array}{r} 10 \\ - 2 \\ \hline 8 \end{array}$   | 5. $\begin{array}{r} 11 \\ - 7 \\ \hline 4 \end{array}$  |
| 6. $\begin{array}{r} 13 \\ - 1 \\ \hline 12 \end{array}$ | 7. $\begin{array}{r} 13 \\ - 10 \\ \hline 3 \end{array}$ | 8. $\begin{array}{r} 27 \\ - 1 \\ \hline 26 \end{array}$ | 9. $\begin{array}{r} 27 \\ - 10 \\ \hline 17 \end{array}$ | 10. $\begin{array}{r} 10 \\ - 1 \\ \hline 9 \end{array}$ |
| 11. $\begin{array}{r} 15 \\ - 9 \\ \hline 6 \end{array}$ | 12. $\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$ | 13. $\begin{array}{r} 13 \\ - 9 \\ \hline 4 \end{array}$ | 14. $\begin{array}{r} 14 \\ - 7 \\ \hline 7 \end{array}$  | 15. $\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$ |

Complete the equations.

16.  $2 \text{ dm} = \blacksquare \text{ cm}$   
20

17.  $2 \text{ dm} + 3 \text{ cm} = \blacksquare \text{ cm}$   
23

Subtract.

- |  |  |  |  |  |
|--|--|--|--|--|
| 18. $\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$ | 19. $\begin{array}{r} 13 \\ - 5 \\ \hline 8 \end{array}$ | 20. $\begin{array}{r} 12 \\ - 8 \\ \hline 4 \end{array}$ | 21. $\begin{array}{r} 13 \\ - 6 \\ \hline 7 \end{array}$ | 22. $\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$ |
|--|--|--|--|--|

23. Which letter is eleventh? **K**      24. Which letter is 16th? **P**  
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Subtract.

- |  |  |  |  |  |
|--|--|--|--|--|
| 25. $\begin{array}{r} 14 \\ - 8 \\ \hline 6 \end{array}$ | 26. $\begin{array}{r} 15 \\ - 7 \\ \hline 8 \end{array}$ | 27. $\begin{array}{r} 16 \\ - 7 \\ \hline 9 \end{array}$ | 28. $\begin{array}{r} 17 \\ - 8 \\ \hline 9 \end{array}$ | 29. $\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array}$ |
|--|--|--|--|--|

30. 13 leaves.  
6 drop.

How many left?  $13 - 6 = 7$

31. 8 blackbirds.  
5 crows.

How many birds?  $8 + 5 = 13$

## Post-test

Unit

Subtract.

- |  |   |  |  |   |
|--|---|--|--|---|
| 1. $\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$  | 2. $\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$   | 3. $\begin{array}{r} 11 \\ - 9 \\ \hline 2 \end{array}$  | 4. $\begin{array}{r} 10 \\ - 5 \\ \hline 5 \end{array}$  | 5. $\begin{array}{r} 10 \\ - 7 \\ \hline 3 \end{array}$   |
| 6. $\begin{array}{r} 25 \\ - 1 \\ \hline 24 \end{array}$ | 7. $\begin{array}{r} 25 \\ - 10 \\ \hline 15 \end{array}$ | 8. $\begin{array}{r} 19 \\ - 1 \\ \hline 18 \end{array}$ | 9. $\begin{array}{r} 19 \\ - 10 \\ \hline 9 \end{array}$ | 10. $\begin{array}{r} 11 \\ - 1 \\ \hline 10 \end{array}$ |
| 11. $\begin{array}{r} 16 \\ - 9 \\ \hline 7 \end{array}$ | 12. $\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$  | 13. $\begin{array}{r} 14 \\ - 9 \\ \hline 5 \end{array}$ | 14. $\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$ | 15. $\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$  |

Complete the equation.

16.  $4 \text{ dm} = \underline{40} \text{ cm}$

17.  $4 \text{ dm} + 6 \text{ cm} = \underline{46} \text{ cm}$



Add.


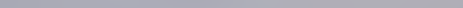
- |     |  |     |   |     |   |     |   |     |   |
|-----|--|-----|---|-----|---|-----|---|-----|---|
| 1.  | $\begin{array}{r} 4 \\ + 6 \\ \hline 10 \end{array}$     | 2.  | $\begin{array}{r} 8 \\ + 7 \\ \hline 15 \end{array}$      | 3.  | $\begin{array}{r} 8 \\ + 3 \\ \hline 11 \end{array}$      | 4.  | $\begin{array}{r} 4 \\ + 7 \\ \hline 11 \end{array}$      | 5.  | $\begin{array}{r} 6 \\ + 5 \\ \hline 11 \end{array}$      |
| 6.  | $\begin{array}{r} 8 \\ + 6 \\ \hline 14 \end{array}$     | 7.  | $\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$      | 8.  | $\begin{array}{r} 5 \\ + 8 \\ \hline 13 \end{array}$      | 9.  | $\begin{array}{r} 8 \\ + 4 \\ \hline 12 \end{array}$      | 10. | $\begin{array}{r} 5 \\ + 7 \\ \hline 12 \end{array}$      |
| 11. | $\begin{array}{r} 9 \\ + 8 \\ \hline 17 \end{array}$     | 12. | $\begin{array}{r} 8 \\ + 8 \\ \hline 16 \end{array}$      | 13. | $\begin{array}{r} 3 \\ + 9 \\ \hline 12 \end{array}$      | 14. | $\begin{array}{r} 9 \\ + 6 \\ \hline 15 \end{array}$      | 15. | $\begin{array}{r} 5 \\ + 5 \\ \hline 10 \end{array}$      |
| 16. | $\begin{array}{r} 8 \\ + 0 \\ \hline 8 \end{array}$      | 17. | $\begin{array}{r} 2 \\ + 9 \\ \hline 11 \end{array}$      | 18. | $\begin{array}{r} 7 \\ + 7 \\ \hline 14 \end{array}$      | 19. | $\begin{array}{r} 4 \\ + 3 \\ \hline 7 \end{array}$       | 20. | $\begin{array}{r} 9 \\ + 4 \\ \hline 13 \end{array}$      |
| 21. | $\begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array}$     | 22. | $\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array}$      | 23. | $\begin{array}{r} 0 \\ + 9 \\ \hline 9 \end{array}$       | 24. | $\begin{array}{r} 7 \\ + 9 \\ \hline 16 \end{array}$      | 25. | $\begin{array}{r} 9 \\ + 5 \\ \hline 14 \end{array}$      |
| 26. | $\begin{array}{r} 10 \\ + 7 \\ \hline 17 \end{array}$    | 27. | $\begin{array}{r} 50 \\ + 3 \\ \hline 53 \end{array}$     | 28. | $\begin{array}{r} 9 \\ + 10 \\ \hline 19 \end{array}$     | 29. | $\begin{array}{r} 8 \\ + 70 \\ \hline 78 \end{array}$     | 30. | $\begin{array}{r} 10 \\ + 6 \\ \hline 16 \end{array}$     |
| 31. | $\begin{array}{r} 4 \\ 1 \\ + 3 \\ \hline 8 \end{array}$ | 32. | $\begin{array}{r} 5 \\ 5 \\ + 8 \\ \hline 18 \end{array}$ | 33. | $\begin{array}{r} 6 \\ 2 \\ + 4 \\ \hline 12 \end{array}$ | 34. | $\begin{array}{r} 9 \\ 2 \\ + 8 \\ \hline 19 \end{array}$ | 35. | $\begin{array}{r} 5 \\ 7 \\ + 4 \\ \hline 16 \end{array}$ |
| 36. | How many balls? 15                                       |     | 6 basketballs   |     |   |     |   |     |   |
| 37. | How many things for golf? 18                             |     | 9 golf clubs  |     |   |     |   |     |   |
|     |  |     | 9 golf balls  |     |   |     |   |     |   |

39

btract.

$$\begin{array}{r} 13 \\ - 7 \\ \hline 6 \end{array} \quad \begin{array}{r} 19. \quad 12 \\ - 4 \\ \hline 8 \end{array} \quad \begin{array}{r} 20. \quad 13 \\ - 4 \\ \hline 9 \end{array} \quad \begin{array}{r} 21. \quad 12 \\ - 7 \\ \hline 5 \end{array} \quad \begin{array}{r} 22. \quad 13 \\ - 8 \\ \hline 5 \end{array}$$

Circle the eleventh triangle.      24. Circle the sixteenth triangle.

tract.

17	26.	15	27.	16	28.	15	29.	14
$\begin{array}{r} 17 \\ - 8 \\ \hline 9 \end{array}$		$\begin{array}{r} 15 \\ - 6 \\ \hline 9 \end{array}$		$\begin{array}{r} 16 \\ - 7 \\ \hline 9 \end{array}$		$\begin{array}{r} 15 \\ - 8 \\ \hline 7 \end{array}$		$\begin{array}{r} 14 \\ - 5 \\ \hline 9 \end{array}$

ve.

14 leaves  
9 drop.  
How many are left? 5

31. 7 blackbirds  
6 crows  
How many birds? 13

# UNIT 3

## Numerals to 9999

Theme: Fantastic Creatures

Lesson		Objective	Vocabulary	Materials
Preview		Review numbers to 99.	true number statement	
1	N3	Read and write numerals to 999.	standard form, expanded form	play money (dollars, ten dollars, hundred dollars), place value blocks, expanded form cards
2	N4	Count to 999 forward and backward by ones, tens, and hundreds.	counting by hundreds, trade 10 tens for 100	place value blocks, counting chart
3	N5	Write numerals in expanded form, table form, and standard form.	counting on	table form cards, place value blocks, counting on cards, expanded form cards
4	N6	Compare and order numbers to 999 using the symbols $<$ and $>$ .	compare, less than, $<$ , greater than, $>$	place value blocks, posters for $<$ and $>$
5	M4	Estimate and measure in metres, decimetres, and centimetres relating these units to place value concepts.	metre, trade 10 dm for 1 m	centimetre, decimetre, and metre strips, metre sticks, metric tapes
6	M5	Identify and write money amounts to \$99.99 relating these to place value concepts.	cents, ¢, dollars, \$	play money (pennies, dimes, dollars, ten dollars)
7	PS5	Locate information from a picture or table and compare amounts to \$99.99.	more, less, between, least, greatest	play money
	PS6	Regroup numbers into standard form and discover recurring patterns.	pattern, trade	counting chart, play money
8	N7	Read and write numerals to 9999 and count to 9999.	thousand, thousands place	place value blocks, counting chart, table form cards
Test		Numbers to 9999		
Review		Subtraction facts to 18		



# About This Unit

Numeration to 999 is the primary focus of Unit 3. Numeration concepts and skills are essential prerequisites for further work with addition, subtraction, metric measurement, and decimal fractions as presented in Units 4, 5, 6, 9, 10, 14, and 15.

The careful development of place value concepts, begun in Units 1 and 2 for numbers to 99, utilizes a proven variety of concrete and symbolic models. For students with the rich experiences suggested in Unit 3, the treatment of numbers to 9999 of Lesson 8 may be easily extended by teachers using available ideas and resources. An alternative approach, supported by the student's text, is to introduce and review skills for numbers larger than 999 throughout the year as they relate to and enrich other topics.

Three fundamental concepts of numeration (the symbolic representation of number) are dealt with in Unit 3: **place value**, **counting**, and **comparing**. That these concepts are intimately associated is inherent in the teaching suggestions of each lesson and they should be stressed frequently during instruction.

## Place Value:

1. The value of a digit in a number depends upon its *place* or position.
2. A number is in standard form if each place contains a digit less than or equal to 9.
3. The place values (ones, tens, hundreds, ...) are interrelated by "trading" equations involving 10. (10 ones = ten, 10 tens = 1 hundred, ...)

## Counting:

1. Counting by ones (tens, hundreds) involves the repetitive addition of 1 (10, 100).
2. When counting, standard form is maintained by implicitly applying "trading" equations wherever necessary.
3. Counting by ones, tens, and hundreds results in patterns which are related and fairly easy to memorize.

## Comparing:

1. The places of a numeral increase in value from right to left.

1000s ← 100s ← 10s ← 1s

2. For comparing multi-digit numerals, begin with the largest place at the left. Continue comparing digits in the same place until unequal digits are found.

# Ideas

The theme of Unit 3 is *Fantastic Creatures*. Activities and illustrations within this unit incorporate creatures from many sources: traditional fantasies, classical myths, modern legends, horror movies, comic books, etc. Opportunities abound for teachers and students to pursue related projects in language arts, art, and drama (including obvious lead-up activities for Halloween). The following children's books are recommended for use with this unit.

## Preview:

- François, A. 1970. *You are Ri-di-cu-lous*. Random House.
- Indgren, A. 1966. *The Tomten and the Fox*. Coward-McCann.
- Gowen, T. 1969. *Dragon Stew*. Follett.
- Tester, S. 1976. *Tell Me a Tale about Trolls*. Child's World Inc.

## Lesson 4:

- Lifton, B. 1972. *Good Night, Orange Monster*. Atheneum.
- Myers, A. 1977. *I Know a Monster*. Addison-Wesley.
- Sendak, M. 1963. *Where the Wild Things Are*. Harper & Row.
- Vionst, J. 1973. *My Mama Says ...* Atheneum.

## Lesson 5:

- Bauman, E. 1972. *Ogopogo*, Watts.
- Bendick, J. 1976. *The Mystery of the Loch Ness Monster*. McGraw Hill.
- Garner, B. 1976. *Canada's Monsters*. Potlatch.
- Green, J. 1973. *The Sasquatch Series*. Chean Ltd., Agassiz, B.C.
- Laycock, G. 1973. *Strange Monsters and Great Searches*. Doubleday.
- Manning-Sanders, R. 1975. *A Book of Monsters*. Dutton.

# UNIT 3

## NUMERALS TO 9999



Unit 3 Objective	Test Questions	Pages
N3	1-3	42-43
N4	13-17	44-45
N5	4-12	46-47
N6	18-21	48-49
M4	22-23	50-51
M5	24-26	52-53
N7	27-29	56-57

### Pretest

Write in standard form.

1. 

100	10	1
3	4	4

  
344

2. 

100	10	1
2	0	5

  
205

3. five hundred fifty-one  
551

4.  $800 + 50 + 6 = 856$

5.  $400 + 10 + 1 = 411$

6.  $900 + 20 = 920$

7.  $20 + 300 + 2 = 322$

8.  $700 + 50 = 750$

9.  $6 + 100 + 30 = 136$

10. 

100	10	1
7	1	9

  
719

11. 

10	1	100
6	5	9

  
965

12. 

1	10	100
2	0	8

  
802

Count.

13. from 165 to 176

14. from 292 to 304

15. from 890 to 908

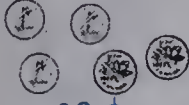





16. by tens from 279 to 329

17. by hundreds from 112 to 912




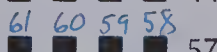
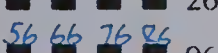



# Fact and Fantasy

Write in standard form.

-  32¢
-  25¢
-  24
-  13
-  \$31
-  \$14
- thirty-six 36
- ninety-two 92
- sixty-four 64
- fifty-three 53

Finish counting.

- 75 76 77  82
- 34 35 36  41
- 33 32 31  26
- 64 63 62  57
- 26 36 46  96
- 5 15 25  75

## True and False

Use = to make true number statements.

- $20 + 6 = 26$
- $40 + 3 = 43$
- $6 + 30 = 36$
- $7 + 90 = 97$
- 3 tens 2 ones  $32$
- 1 ten 6 ones  $16$
- 3 ones 8 tens  $83$
- 7 ones 3 tens  $37$
- $24 + 1 = 25$
- $37 + 1 = 38$
- $52 + 10 = 62$
- $27 + 10 = 37$

41

Use < or >.

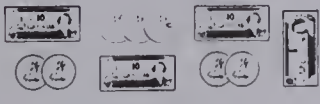
- 276 > 269
- 487 < 712
- 624 > 623
- 99 < 111

Complete the equations.

- $6\text{ m} = 600\text{ cm}$
- $5\text{ m} + 2\text{ dm} + 4\text{ cm} = 524\text{ cm}$

Write the dollar sign.

- |      |     |     |    |
|------|-----|-----|----|
| \$10 | \$1 | 10¢ | 1¢ |
| 7    | 5   | 4   | 3  |

  
\$75.43
- 
  
\$31.43
- 35¢
  
\$0.35

Complete.

- |      |     |    |   |
|------|-----|----|---|
| 1000 | 100 | 10 | 1 |
| 4    | 0   | 6  | 2 |

= 4062
- four thousand eleven = 4011

- 3795 3796 3797 3798 3799 3800 3801 3802



## UNIT 3

## PREVIEW

### Suggestions

Discuss various characters and creatures from fantasy stories using page 40 as a starting point. Focus on the difference between *fact* and *fantasy*.

Review these numeration concepts developed in Units 1 and 2:

#### 1. Standard form

Check that the children can write a numeral in standard form from various models (dimes and pennies, ten and one dollar bills, and arrows on a target). Practise reading and writing numerals.

#### 2. Expanded form

Review expanded form and tens-and-ones form.

$$36 = 30 + 6$$

or

$$30 = 3 \text{ tens} + 6 \text{ ones}$$

#### 3. Counting by tens and ones

Review addition involving one more and 10 more and relate these to counting.

$$72 + 1 = 73$$

$$72 + 10 = 82$$

### About the Page

Practice is given in writing numerals in standard form, counting, and writing **true number statements**. Point out that to make a number statement true the value to the left and to the right of the equals sign must be the same. Otherwise, the number statement is *false*.

### Reinforcement

1. With money stamps (available commercially) make a set of work cards from which the students must write numerals in standard form.

2. Practise counting on to 100 using metric materials (decimetre and centimetre strips) and money materials (one dollar bills and ten dollar bills).

3. Prepare an equations worksheet. Include a mixture of true and false equations. Have the children find the false statements and correct them.

# UNIT 3 LESSON 1

## Objective N3

Read and write numerals to 999.

## Introducing the Lesson

Show a play hundred dollar bill and explain that it is the same as 10 ten dollar bills. Count by hundreds to 900 using hundred dollar bills. Record the count on the chalkboard.

\$100, \$200, \$300 ...

## Teaching the Lesson

Relate the block models for ones (◻ cube), tens (▬ rod), and hundreds (▭ flat) as shown on page 42. Develop an equation showing the relationship of tens and ones.

$$\begin{array}{c} \square \\ \hline 10 \text{ ones} = 1 \text{ ten} \end{array}$$

Have the children count the number of cubes and 10 rods in the 100 flat. Discuss the equations for these relationships.

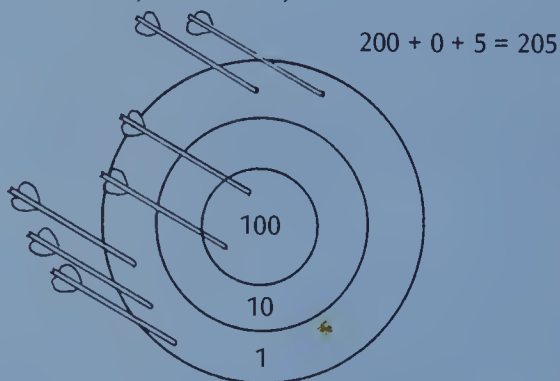
$$\begin{array}{c} \square \\ \hline 10 \text{ tens} = 1 \text{ hundred} \end{array}$$

$$\begin{array}{c} \square \\ \hline 100 \text{ ones} = 1 \text{ hundred} \end{array}$$

With the 1, 10, and 100 blocks build models representing the numbers 243, 642, 904, and 140. Arrange some of the models in patterns like those on page 43. Using a set of expanded form cards, write the numbers in expanded form, standard form, and in words.

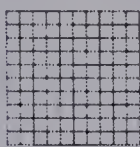
$$\boxed{200} + \boxed{40} + \boxed{3} = \boxed{243} \text{ "Two hundred forty-three"}$$

Represent several three-digit numbers using a target board. Include numbers with no tens, no ones, or no hundreds.



# Hundreds

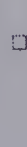
hundred  
100



ten  
10

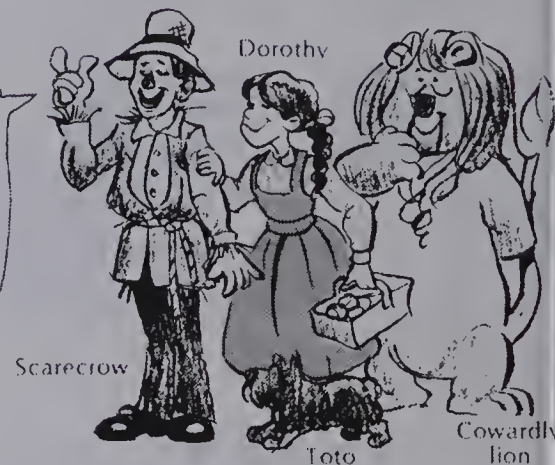
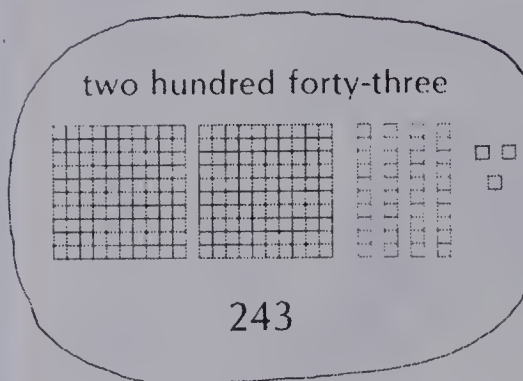


one  
1



$$\begin{array}{l} 1 \text{ hundred} = 10 \text{ tens} \\ 100 = 10 \text{ tens} \end{array}$$

$$\begin{array}{l} 1 \text{ ten} = 10 \text{ ones} \\ 10 = 10 \text{ ones} \end{array}$$



## EXERCISES

Write in standard form.

1. 232

2. 136

3. 215

4. 363

5. 528

6. 805

42

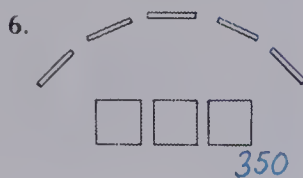
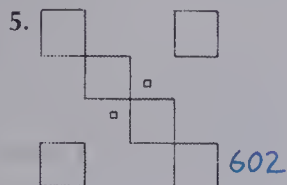
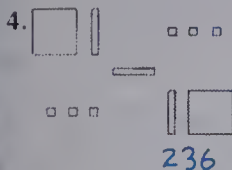
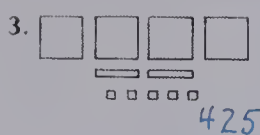
## Using the Exercises

- Questions 1 to 6 give 1, 10, and 100 place value block representations of three-digit numerals to be written in standard form.



## PRACTICE

Write in standard form.



7. three hundred fifty-one 351

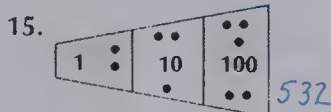
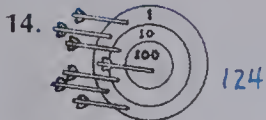
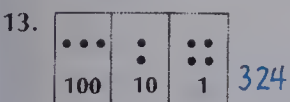
8. seven hundred twenty-six 726

9. nine hundred eleven 911

10. two hundred five 205

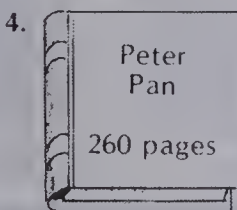
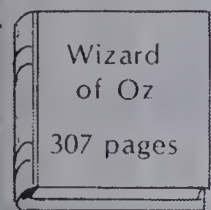
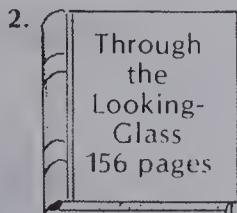
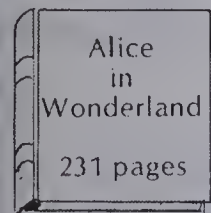
11. five hundred thirty 530

12. one hundred nine 109



## Four Favourite Fantasies

Write in words how many pages.



1. two hundred thirty-one

2. one hundred fifty-six

43

3. three hundred seven

4. two hundred sixty

## Practice

## Worksheet N3

Pages 42-43

Write in standard form.

four hundred sixteen 416

2. eight hundred eleven 811

one hundred seventy-six 176

4. three hundred sixty-two 362

seven hundred fifty-eight 758

6. two hundred six 206

five hundred twenty 520

8. six hundred three 603

Complete these equations.

10 ones = 1 ten

10. 10 tens = 1 hundred

11. 100 ones = 1 hundred

10 ones = 1 ten

13. 10 tens = 1 hundred

14. 100 ones = 1 hundred

## Assigning the Practice

Minimum: 1-15

Average: 1-15

Enriched: 1-15

## Reinforcement

1. Assign *Four Favourite Fantasies*, page 43. Discuss the fantasy stories portrayed. Enlist your librarian to present similar materials.

2. With place value number block stamps (available commercially) make a set of work cards from which the children write numerals in standard form.

3. Make a floor place value target having regions for ones, tens, and hundreds. Allow the children to toss 15 light objects from a sufficient distance that some chance is involved. Ask the children to describe the number they make with their tosses by writing it in expanded and standard form. (Lesson 4 includes another floor place value activity.)

## Enrichment

1. Using place value number blocks, make numbers for which one digit is greater than 9. Show how to trade 10 ones for 1 ten or 10 tens for 1 hundred to change the initial number into standard form (no digit greater than 9).

2. Make designs and pattern sequences with the number blocks.



Discuss the geometric properties (symmetry) of the designs and the repetitive features of the sequences.

3. Prepare work cards containing 2 three-digit numbers. Have the students make each number into as high a block tower as possible, compare the heights of the two block towers, and circle the number which gives the taller tower.

## Objective N4

Count to 999 forward and back by ones, tens, and hundreds.

## Introducing the Lesson

Review the place value equations.

10 a =

$10 \text{ } \underline{\hspace{1cm}} \text{ } = \text{ } \boxed{\hspace{1cm}}$

Practise relating models of numbers to their standard form.

## Teaching the Lesson

Build the number 34 with blocks and record the standard form on a counting chart. Add a flat (a hundred) to the number and record the result (134). Continue this process until you reach 934. Discuss the number pattern. Without materials, complete several sequences counting by hundreds. With and without blocks, practise counting back by hundreds.

Discuss why a number like

2	10	0
---	----	---

 is not in standard form.  
Introduce and stress the term **trade** to describe place value regrouping.

Record 

3	0	0
---	---	---

 on the counting chart. Continue *counting forward and back by tens* using materials. Study the number pattern and count by tens without materials.

When counting by tens and hundreds has been established, introduce *counting forward by ones* (from 138) with number blocks and vertical counting charts as shown on page 44. Discuss why a number like 

1	3	10
---	---	----

 is not in standard form. Have the class recall the equation that allows one to trade 10 cubes for 1 rod. Record 

1	4	0
---	---	---











. Ask the pupils to study the number pattern and count without materials.












Demonstrate, while counting from 298 to 302, that two *trades* are necessary to arrive at the number 300.

2 9 10 → 2 10 0 → 3 0 0

# Counting

To count by ones add another .

			1	3	8
			1	3	9
			1	4	0
			1	4	1

			2	9	8
			2	9	9
			3	0	0
			3	0	1
			3	0	2

We traded **10** ones for 1 ten.

First, we traded 10 ¢ for 1  $\frac{1}{2}$ .  
Then we traded 10  $\frac{1}{2}$  for 1  $\square$ .

Forward by ones.

167 168 169 170

Backward by ones.

492 491 490 489

Forward by tens.

167 177 187 197

Backward by tens.

492 482 472 462

Forward by hundreds.

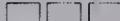












167 267 367 467

Backward by hundreds.

492      392      292      192

## EXERCISES

Finish counting.

1.				3	9	8
				3	9	9
						40
						40
						40
						40

2. 267 268 269 270 271 272

3. 192 193 194 195 196 197

4. 497 498 499 500 501 502

5. 230 240 250 260 270 280

6. 205 305 405 505 605 705

## Using the Exercises

- Question 1 provides a block model for the completion of the counting by ones exercise. Questions 2 to 6 give practice with counting by ones, tens, and hundreds.



## PRACTICE

Count by **ones**.

1. from 96 to 103
2. from 185 to 192
3. from 297 to 304
4. from 332 to 339
5. from 436 to 443
6. from 587 to 594
7. from 695 to 702
8. from 762 to 769
9. from 992 to 999
10. backward from 449 to 442
11. backward from 897 to 890
12. backward from 183 to 176
13. backward from 104 to 97
14. backward from 405 to 398
15. backward from 634 to 627

Count by **tens**.

16. from 125 to 195
17. from 260 to 330
18. from 782 to 852
19. backward from 251 to 181
20. backward from 736 to 666

Count by **hundreds**.

21. from 100 to 800
22. from 206 to 906
23. from 124 to 824
24. backward from 907 to 207
25. backward from 730 to 30

## Cross-Counting

Copy the squares.

Try to find patterns to complete them.

157	158	159
257	258	259
357	358	359

135	235	335
145	245	345
155	255	355

769	779	789
770	780	790
771	781	791

45

## Assigning the Practice

Minimum: odd numbers

Average: 1-25

Enriched: 1-25

## Reinforcement

1. Assign *Cross-Counting*, page 45.

2. Help the children construct a number line from 0 to 999 on cash register paper with wide felt markers. Prepare a "bank" of 2 m long paper strips each headed by a different number.

368

Have the children tape the sections in order along the baseboard in the hallway. Use the number line for counting on activities (6 more than 368). Assign workers to maintain its condition.

3. Prepare 100-charts on 10 by 10 grids for the one hundreds, two hundreds, etc. Compare the number patterns with those on the usual 100-chart shown on page 18.

4. Prepare counting dot-to-dots.

## Enrichment

1. Orally direct the children to draw a twisting path through a 100-chart haunted house. "Start at 400. Count by tens to 460. Now go forward by ones to 463, etc."

2. Construct several paper playing boards like the one shown below. Each player in turn rolls a die and counts forward on his or her board. Play may start at number 635 and end at 725. For example, a roll of 6 means a move from 635 to 641. Show the children how the trading step is done. The first player to reach 725 wins.

Hundreds	Tens	Ones
9	9	9
8	8	8
7	7	7
6	6	6
5	5	5
4	4	4
3	3	3
2	2	2
1	1	1
0	0	0

## Practice

Complete the counting patterns.

240 250 260 270 280 290 300 310 320

353 352 351 350 349 348 347 346 345

920 820 720 620 520 420 320 220 120

726 727 728 729 730 731 732 733 734

395 396 397 398 399 400 401 402 403

635 645 655 665 675 685 695 705 715

121 121 221 321 421 521 621 721 821

562 552 542 532 522 512 502 492 482

404 403 402 401 400 399 398 397 396

720 710 700 690 680 670 660 650 640

## Worksheet N4

Pages 44-45

# UNIT 3 LESSON 3

## Objective N5

Write numerals in expanded form, table form, and standard form.

## Introducing the Lesson

Use *outer space cards* (1s, 10s, and 100s) to count on to 231 as shown on page 46. Carefully apply this procedure to models for 900, 450, 320, 152, and 209. Discuss examples where trading is required.

## Teaching the Lesson

Record the number block representation of 124 in **table form** as shown on page 46. Then translate the numeral into standard form.

100s	10s	1s
1	2	4

= 124

For several numbers, present table form cards in different orderings. Have the children place the cards in correct order and write the standard form number.

10s	1s	100s
7	2	3

→

100s	10s	1s
3	7	2

= 372

Use the expanded form cards to demonstrate how expanded form and standard form are related.

$$\boxed{300} + \boxed{10} + \boxed{5} = \boxed{315}$$

Discuss expanded form examples for which the addends are in a different order,  $\boxed{10} + \boxed{5} + \boxed{300}$ , and also for which the tens or ones place is not given,  $\boxed{300} + \boxed{5}$ .

Practise expanded form equations involving *missing addends*,  $(400 + \square + 20 = 426)$ .

# Numerals to 999

Listen to the space robots talking about numerals.

**Counting on!**  
100, 200, 210, 220, 230, 231  
We have 231 spacemen in the sky.

**Table Form**

Hundreds	Tens	Ones
1	2	4

I have 124 energy cells.

**Expanded Form**  
 $300 + 10 + 5 = 315$   
I scored 315 points with my ray gun.

231, 124, and 315 are in **standard form**.

## EXERCISES

Write in **standard form**.

1.

hundreds	tens	ones
5	6	8

568

2.

hundreds	tens	ones
1	6	2

162

3.

100s	10s	1s
4	7	2

472

4.  $200 + 30 + 6$

236

5.  $700 + 20 + 4$

724

6.  $900 + 60 + 7$

967

Write in **expanded form** and **standard form**.

7.

126

8.

267

9.

247

## Using the Exercises

- Questions 1 to 6 require that the standard form be written from table form and expanded form.
- Questions 7 to 9 require that the expanded form and standard form be written from three different models.



## PRACTICE

Write in standard form.

1.  $100 + 60 + 7 = 167$
2.  $200 + 90 + 2 = 292$
3.  $8 + 70 + 500 = 578$
4.  $9 + 30 + 100 = 139$
5.  $30 + 600 + 5 = 635$
6.  $50 + 700 + 6 = 756$
7.  $500 + 8 = 508$
8.  $600 + 30 = 630$
9.  $100 + 4 = 104$

10. <table border="1"><tr><td>Hundreds</td><td>Tens</td><td>Ones</td></tr><tr><td>6</td><td>7</td><td>2</td></tr></table> 672	Hundreds	Tens	Ones	6	7	2	11. <table border="1"><tr><td>Hundreds</td><td>Tens</td><td>Ones</td></tr><tr><td>3</td><td>0</td><td>6</td></tr></table> 306	Hundreds	Tens	Ones	3	0	6	12. <table border="1"><tr><td>Hundreds</td><td>Tens</td><td>Ones</td></tr><tr><td>7</td><td>8</td><td>0</td></tr></table> 780	Hundreds	Tens	Ones	7	8	0
Hundreds	Tens	Ones																		
6	7	2																		
Hundreds	Tens	Ones																		
3	0	6																		
Hundreds	Tens	Ones																		
7	8	0																		
13. <table border="1"><tr><td>Tens</td><td>Ones</td><td>Tens</td></tr><tr><td>3</td><td>4</td><td>1</td></tr></table> 143	Tens	Ones	Tens	3	4	1	14. <table border="1"><tr><td>Tens</td><td>Ones</td><td>Tens</td></tr><tr><td>6</td><td>2</td><td>3</td></tr></table> 326	Tens	Ones	Tens	6	2	3	15. <table border="1"><tr><td>Tens</td><td>Ones</td><td>Tens</td></tr><tr><td>3</td><td>6</td><td>2</td></tr></table> 632	Tens	Ones	Tens	3	6	2
Tens	Ones	Tens																		
3	4	1																		
Tens	Ones	Tens																		
6	2	3																		
Tens	Ones	Tens																		
3	6	2																		
16. <table border="1"><tr><td>Tens</td><td>Hundreds</td><td>Ones</td></tr><tr><td>2</td><td>5</td><td>6</td></tr></table> 526	Tens	Hundreds	Ones	2	5	6	17. <table border="1"><tr><td>Hundreds</td><td>Ones</td></tr><tr><td>6</td><td>8</td></tr></table> 608	Hundreds	Ones	6	8	18. <table border="1"><tr><td>Hundreds</td><td>Tens</td></tr><tr><td>7</td><td>3</td></tr></table> 730	Hundreds	Tens	7	3				
Tens	Hundreds	Ones																		
2	5	6																		
Hundreds	Ones																			
6	8																			
Hundreds	Tens																			
7	3																			

Complete the equation.

19.  $200 + \boxed{60} + 7 = 267$
20.  $300 + 80 + \boxed{5} = 385$
21.  $\boxed{700} + 20 + 8 = 728$
22.  $726 = 20 + 700 + \boxed{6}$
23.  $835 = 5 + 800 + \boxed{30}$
24.  $613 = 10 + 3 + \boxed{600}$

Count on! Circle the last number.

25. 313

26. 435

## Computer Tutor

Add ten.		How many hundreds?		Add 100.	
IN	OUT	IN	OUT	IN	OUT
368	378	762	7	200	300
250	?	345	?	170	?
631	?	627	?	506	?
190	?	21	?	235	?
892	?	902	?	752	?

260, 641, 200, 902      3, 6, 0, 9      270, 606, 335, 852

## Practice

Write in standard form.

1.  $200 + 30 + 6 = 236$
2.  $500 + 40 + 7 = 547$
3.  $800 + 20 + 1 = 821$
4.  $400 + 30 + 2 = 432$
5.  $600 + 80 + 9 = 689$
6.  $200 + 70 + 8 = 278$
7.  $300 + 40 = 340$
8.  $700 + 50 = 750$
9.  $100 + 30 = 130$
10.  $900 + 10 = 910$
11.  $200 + 7 = 207$
12.  $600 + 4 = 604$
13.  $100 + 3 = 103$
14.  $800 + 1 = 801$
15.  $60 + 4 + 100 = 164$
16.  $70 + 200 + 8 = 278$
17.  $3 + 50 + 800 = 853$
18.  $8 + 100 = 108$

## Worksheet N5

Pages 46-47

## Assigning the Practice

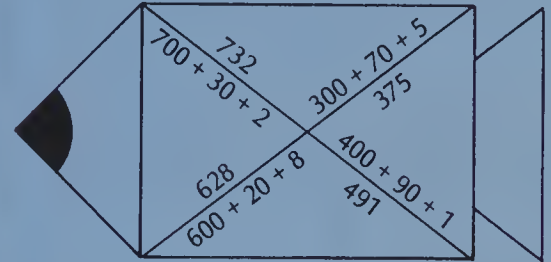
Minimum: 1-18

Average: 1-24

Enriched: 1-26

## Reinforcement

1. Assign *Computer Tutor*, page 47.
2. Give the children the following worksheet puzzle. Have them cut out the pieces, mix them up, and paste them together again.



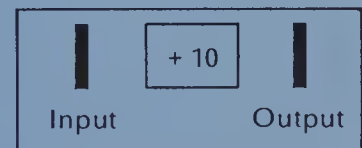
3. Play a game like "Fish" with expanded form cards (8 cm x 12 cm—  $200$ ,  $70$ ,  $2$ ) and numeral cards (8 cm x 12 cm—  $272$ ). Each player is dealt four cards and the remaining cards become a draw pile. Players take turns drawing cards with the object of forming "books" of all the 4-card true statements they can.

$$200 + 70 + 2 = 272$$

## Enrichment

Build a math computer from a large cardboard box. Include an *input* slot, an *output* slot, and a *rule* display clip and peek hole.

1. *Find the Output:* Have someone put a number card through the input slot. A child inside the computer box applies the rule and sends the answer through the output slot.



2. *Find the Input:* The computer outputs a number on a card. The student must determine the input by applying the *inverse* of the rule.

3. *Guess the Rule:* Pairs of input and output numbers are put out. The student must guess the rule from several cases.

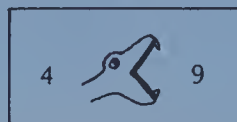
# UNIT 3 LESSON 4

## Objective N6

Compare and order numbers to 999 using the symbols  $<$  and  $>$ .

## Introducing the Lesson

**Compare** numbers less than 10, "7 is less than 9". Recall the meaning of the symbols  $<$  and  $>$ . Ask the students to think of a snake's greedy open mouth:



Display mnemonic posters to develop correct language for  $<$  and  $>$ .

5 is **Less** than 6.

6 is **Greater** than 5.

Using number blocks or expanded form cards, compare multiples of ten ( $70 > 30$ ) and then multiples of a hundred ( $300 < 500$ ).

## Teaching the Lesson

Show how a monster-machine game board (page 48) is used to compare numbers. (First, hundreds are compared. If these are different, the number with the most hundreds is the greater ...). With the machine and the expanded form cards compare these numbers: 435 and 587; 254 and 249; 517 and 512. For example, guided by the machine  $\begin{bmatrix} 4 & 3 & 5 \end{bmatrix} < \begin{bmatrix} 5 & 8 & 7 \end{bmatrix}$  since  $\begin{bmatrix} 4 & 0 & 0 \end{bmatrix} < \begin{bmatrix} 5 & 0 & 0 \end{bmatrix}$ .

Discuss the comparison method that is built into the comparing machine. (It is actually a flow chart.) Use number block models of three-digit numbers to show that it is reasonable to first compare hundreds, next tens, and finally ones.

Using the machine, the blocks, and eventually no aids, have the students compare numbers to 999. Note that numbers less than 100 have 0 hundreds.

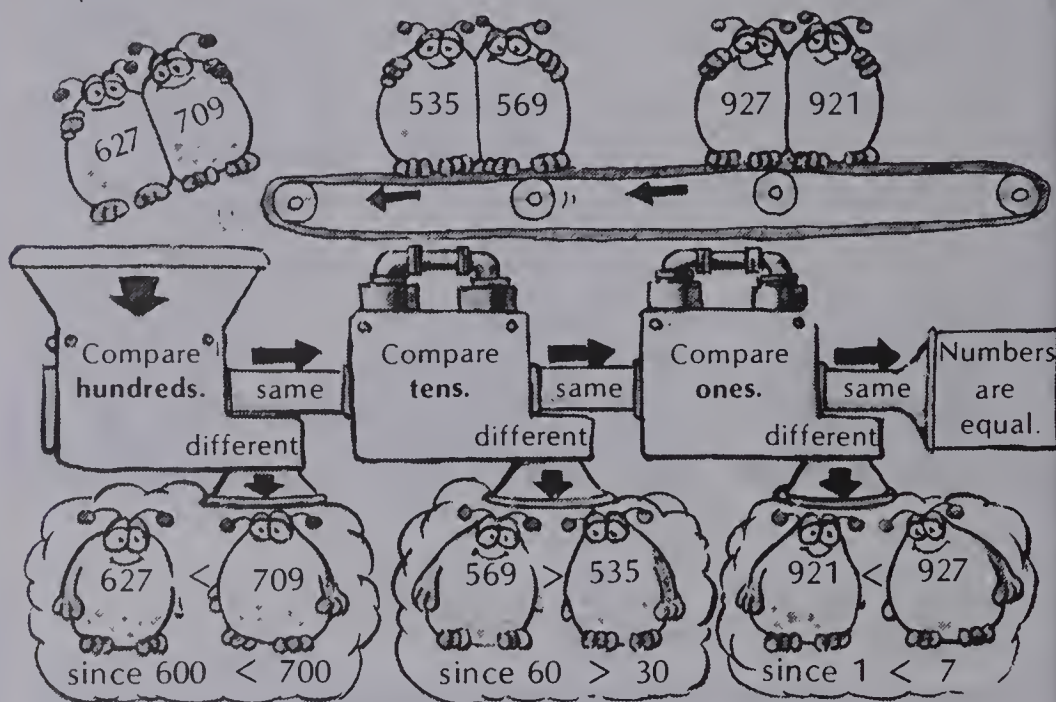
Put sets of two- and three-digit numbers in order from **least** to **greatest**.

## Comparing

$20 < 40$   
20 is **less** than 40

$700 > 300$   
700 is **greater** than 300

Compare these numbers with the monster machine.



## EXERCISES

Which is greater?

1. 620 730 **730**
2. 520 490 **520**
3. 590 560 **590**
4. 314 320 **3**
5. 68 53 **68**
6. 428 98 **428**
7. 59 53 **59**
8. 650 657 **657**

Use  $>$  or  $<$ .

9. 520 • 620
10. 170 • 150
11. 702 • 90
12. 603 • 630

## Using the Exercises

- Questions 1 to 8 require that the greater of two numbers be written.
- Questions 9 to 12 require that the proper comparison sign be selected.



## PRACTICE

Use  $<$ ,  $>$ , or  $=$  to make true statements.

1.  $250 \bullet 230$
2.  $78 \bullet 83$
3.  $120 \bullet 90$
4.  $306 \bullet 309$
5.  $709 \bullet 800$
6.  $568 \bullet 590$
7.  $307 \bullet 209$
8.  $78 \bullet 103$
9.  $206 \bullet 199$
10.  $452 \bullet 450$
11.  $781 \bullet 780$
12.  $342 \bullet 542$
13.  $80 + 7 \bullet 78$
14.  $300 + 9 \bullet 309$
15.  $60 + 100 + 3 \bullet 613$

List the numerals from least to greatest.

16.  $23, 32, 53, 69, 96$
17.  $120, 260, 330, 450, 890$
18.  $302, 308, 407, 420, 901$

## REVIEW

Write in standard form.

1. 247
2. 446
3. three hundred six 306

Finish counting.

4. 737 738 741
5. 498 499 502
6. 737 747 777
7. 498 598 898

Write in standard form.

8.  $300 + 20 + 6$  326
9.  $20 + 900 + 2$  922
10. 732
11. 614

Use  $<$  or  $>$ .

12.  $63 \bullet 75$
13.  $186 \bullet 181$
14.  $235 \bullet 401$
15.  $398 \bullet 389$

49

## Extra Practice

## Worksheet N6

Pages 48-49

$<$ ,  $>$ , or  $=$  to make true statements.

1.  $830 \bullet 890$
2.  $29 \bullet 31$
3.  $405 \bullet 408$
4.  $607 \bullet 700$
5.  $448 \bullet 480$
6.  $399 \bullet 598$
7.  $68 \bullet 86$
8.  $509 \bullet 905$
9.  $687 \bullet 786$
10.  $203 \bullet 302$
11.  $498 \bullet 499$
12.  $355 \bullet 555$
13.  $109 \bullet 87$
14.  $223 \bullet 232$
15.  $99 \bullet 101$
16.  $60 + 7 \bullet 67$
17.  $70 + 8 \bullet 87$
18.  $200 + 3 \bullet 32$
19.  $800 + 60 + 3 \bullet 863$

## Assigning the Practice

Minimum: 1-8, 15, 16

Average: 1-11, 15-18

Enriched: 1-18

## Review Exercises

Questions	Objective	Pages
1-3	N3	42-43
4-7	N4	44-45
8-11	N5	46-47
12-15	N6	48-49

## Reinforcement

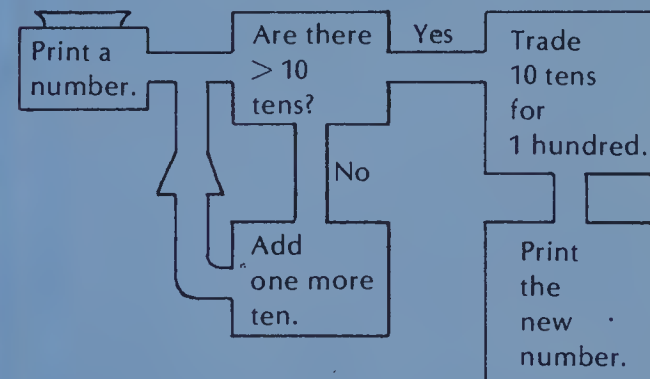
1. Using the place value target (*Reinforcement*, page 43), have the pupils make tosses to create three-digit numerals. The student with the largest number wins.

2. Provide dot-to-dot worksheets based on the ordering of (not counting of) numbers to 999.

3. Supply a very lengthy book and a jar of 10 to 20 book markers each showing a page number. Let the students locate and place a book mark on each of the pages.

## Enrichment

1. Introduce other math flow charts like this counting by ten game board.



2. The Dewey Decimal System uses three-digit numerals. Visit the school library to compare numbers for Fairy Tales, Outer Space, Myths, Animals, Halloween, etc. Discuss how shelving books requires comparisons.

3. Use the baseboard number line (*Reinforcement*, page 45) for comparison races. Give each child ten numbers to find on the number line.

# UNIT 3 LESSON 5

## Objective M4

Estimate and measure in metres, decimetres, and centimetres relating these units to place value concepts.

## Introducing the Lesson

Introduce the **metre** as a standard unit of measure. Estimate things in the room that measure about 1 m, 2 m, etc.

Recall that  $10 \text{ cm} = 1 \text{ dm}$  (pages 28-29). Using materials lead the students to discover that  **$10 \text{ dm} = 1 \text{ m}$** .

Counting by tens with centimetre strips, determine that  **$100 \text{ cm} = 1 \text{ m}$** .

Counting by hundreds with metre strips, determine that  $3 \text{ m} = 300 \text{ cm}$ ,  $7 \text{ m} = 700 \text{ cm}$ , etc.

## Teaching the Lesson

This introductory lesson requires several days.

Read and discuss page 50 together.

Carefully explain the following type of reasoning.

$$2 \text{ m} + 4 \text{ dm} + 6 \text{ cm} = 200 \text{ cm} + 40 \text{ cm} + 6 \text{ cm} = 246 \text{ cm}$$

$$6 \text{ m} + 2 \text{ dm} = 600 \text{ cm} + 20 \text{ cm} = 620 \text{ dm}$$

$$4 \text{ m} + 6 \text{ cm} = 400 \text{ cm} + 6 \text{ cm} = 406 \text{ cm}$$

Demonstrate the following procedure for **measuring**.

1. Place metre, decimetre, and centimetre strips end to end to match the distance being measured.
2. Count the centimetre strips used. Trade each set of 10 centimetre strips for 1 decimetre strip.
3. Trade each set of 10 decimetre strips for a metre strip.
4. Add the total number of metre, decimetre, and centimetre strips used. (With trading, 3 m, 15 dm, and 23 cm becomes  $4 \text{ m} + 7 \text{ dm} + 3 \text{ cm}$ . But  $4 \text{ m} + 7 \text{ dm} + 3 \text{ cm} = 473 \text{ cm}$ .)

Discover that efficient measuring (no trading) occurs if the strips are used in descending order (metre, decimetre, and finally centimetre).

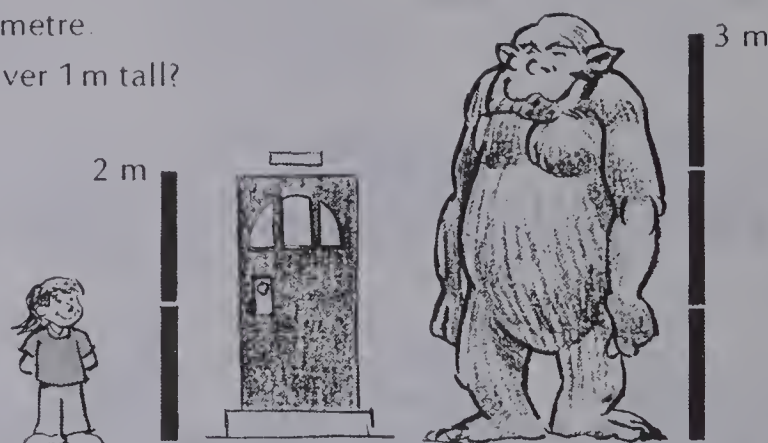
# Metres Decimetres Centimetres

A **metre** is 10   decimetres long.

A **metre** is 100   centimetres long.

Use **m** for metre.

Is the girl over 1 m tall?



Is the Sasquatch really 3 m tall?

$$3 \text{ m} = 300 \text{ cm} \quad 3 \text{ m} + 6 \text{ dm} = 360 \text{ cm} \quad 3 \text{ m} + 6 \text{ dm} + 2 \text{ cm} = 362 \text{ cm}$$

$$3 \text{ m} + 2 \text{ cm} = 302 \text{ cm}$$

## EXERCISES

How many centimetres in all? Complete the equations.

- |  |   |  |
|--|---|--|
| 1. $2 \text{ m} = \overset{200}{\blacksquare} \text{ cm}$  | 2. $2 \text{ m} + 6 \text{ dm} = \overset{260}{\blacksquare} \text{ cm}$  | 3. $2 \text{ m} + 6 \text{ dm} + 4 \text{ cm} = \overset{264}{\blacksquare} \text{ cm}$  |
| 4. $7 \text{ m} = \overset{700}{\blacksquare} \text{ cm}$  | 5. $7 \text{ m} + 2 \text{ cm} = \overset{702}{\blacksquare} \text{ cm}$  | 6. $7 \text{ m} + 5 \text{ dm} + 2 \text{ cm} = \overset{752}{\blacksquare} \text{ cm}$  |
| 7. $1 \text{ m} = \overset{100}{\blacksquare} \text{ cm}$  | 8. $1 \text{ m} + 6 \text{ dm} = \overset{160}{\blacksquare} \text{ cm}$  | 9. $1 \text{ m} + 6 \text{ dm} + 7 \text{ cm} = \overset{167}{\blacksquare} \text{ cm}$  |
| 10. $9 \text{ m} = \overset{900}{\blacksquare} \text{ cm}$ | 11. $9 \text{ m} + 2 \text{ cm} = \overset{902}{\blacksquare} \text{ cm}$ | 12. $9 \text{ m} + 4 \text{ dm} + 2 \text{ cm} = \overset{942}{\blacksquare} \text{ cm}$ |
| 13. $6 \text{ m} = \overset{600}{\blacksquare} \text{ cm}$ | 14. $6 \text{ m} + 5 \text{ cm} = \overset{605}{\blacksquare} \text{ cm}$ | 15. $6 \text{ m} + 0 \text{ dm} + 5 \text{ cm} = \overset{605}{\blacksquare} \text{ cm}$ |

50

## Using the Exercises

- Questions 1 to 15 are grouped in threes. Each group starts with the changing of metres to centimetres and systematically progresses to the changing of metres, decimetres, and centimetres to centimetres.



## PRACTICE

Complete the equations.

1.  $4\text{ m} = \overset{400}{\blacksquare}\text{ cm}$
2.  $8\text{ m} = \overset{800}{\blacksquare}\text{ cm}$
3.  $5\text{ m} = \overset{500}{\blacksquare}\text{ cm}$
4.  $3\text{ m} + 7\text{ dm} = \overset{370}{\blacksquare}\text{ cm}$
5.  $9\text{ m} + 3\text{ dm} + 6\text{ cm} = \overset{936}{\blacksquare}\text{ cm}$
6.  $8\text{ m} + 4\text{ cm} = \overset{804}{\blacksquare}\text{ cm}$
7.  $1\text{ m} + 2\text{ dm} + 5\text{ cm} = \overset{125}{\blacksquare}\text{ cm}$
8.  $7\text{ m} + 3\text{ dm} = \overset{730}{\blacksquare}\text{ cm}$
9.  $4\text{ m} + 0\text{ dm} + 4\text{ cm} = \overset{404}{\blacksquare}\text{ cm}$
10.  $5\text{ dm} + 3\text{ cm} = \overset{53}{\blacksquare}\text{ cm}$
11.  $8\text{ m} + 4\text{ dm} + 0\text{ cm} = \overset{840}{\blacksquare}\text{ cm}$
12.  $9\text{ m} + 0\text{ dm} = \overset{900}{\blacksquare}\text{ cm}$
13.  $5\text{ m} + 0\text{ dm} + 0\text{ cm} = \overset{500}{\blacksquare}\text{ cm}$

14. Complete the table. Use strips. Check with metric tape.

<i>Answers will vary.</i>	Estimate	Measure
width of room	$\blacksquare\text{ m}$	$\blacksquare\text{ m} + \blacksquare\text{ dm} + \blacksquare\text{ cm} = \blacksquare\text{ cm}$
length of room	$\blacksquare\text{ m}$	$\blacksquare\text{ m} + \blacksquare\text{ dm} + \blacksquare\text{ cm} = \blacksquare\text{ cm}$
length of chalkboard	$\blacksquare\text{ m}$	$\blacksquare\text{ m} + \blacksquare\text{ dm} + \blacksquare\text{ cm} = \blacksquare\text{ cm}$
length of coat rack	$\blacksquare\text{ m}$	$\blacksquare\text{ m} + \blacksquare\text{ dm} + \blacksquare\text{ cm} = \blacksquare\text{ cm}$

## Creature Hunt

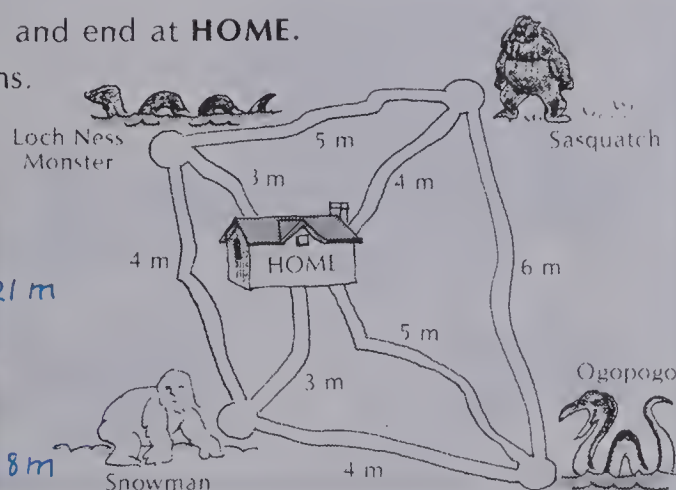
Visit the creatures. Begin and end at HOME.

Describe the shortest paths.

Snowman and Sasquatch *14 m*

Loch Ness Monster, Ogopogo, and Sasquatch *21 m*

Snowman, Ogopogo, and Loch Ness Monster *18 m*



51

## Assigning the Practice

Minimum: 1-14

Average: 1-14

Enriched: 1-14

## Reinforcement

1. Assign *Creature Hunt*, page 51.

2. With masking tape devise a Creature Path on the floor. Have the children measure each section in turn with rulers or tapes.



3. Devise work cards on changing metres, decimetres, and centimetres and tape them on lengths around the room.

$$6\text{ m} + 9\text{ dm} + 4\text{ cm} = \underline{\hspace{2cm}}\text{ cm}$$

## Enrichment

1. Compare the approximate heights and lengths of common monsters (Tyrannosaurus Rex, Godzilla, Brontosaurus, Sasquatch, etc.) Have the students recall the difference between fact and fantasy discussed in the Preview.

2. Prepare monster measurement work cards. Have the children design a monster according to the given specifications. Allow for further elaboration.

1. 109 cm tall
2. about 3 dm wide
3. 3 dm, 2 cm tail
4. 31 cm beak
5. 2 dm wings
6. 63 cm ears
7. 15 cm horn
8. 11 cm claws

3. Construct a "Creature Hunt" in your classroom that is patterned after the exercise on page 51.

## Extra Practice

## Worksheet M4

Pages 50-51

Complete the table.

*Answers will vary.*

	Estimate	Measure
Distance from door to pencil sharpener	$\underline{\hspace{1cm}}\text{ m}$	$\underline{\hspace{1cm}}\text{ m} + \underline{\hspace{1cm}}\text{ dm} + \underline{\hspace{1cm}}\text{ cm} = \underline{\hspace{1cm}}\text{ cm}$
Distance from door to window	$\underline{\hspace{1cm}}\text{ m}$	$\underline{\hspace{1cm}}\text{ m} + \underline{\hspace{1cm}}\text{ dm} + \underline{\hspace{1cm}}\text{ cm} = \underline{\hspace{1cm}}\text{ cm}$
Distance from door to drinking fountain	$\underline{\hspace{1cm}}\text{ m}$	$\underline{\hspace{1cm}}\text{ m} + \underline{\hspace{1cm}}\text{ dm} + \underline{\hspace{1cm}}\text{ cm} = \underline{\hspace{1cm}}\text{ cm}$
Length of the hallway	$\underline{\hspace{1cm}}\text{ m}$	$\underline{\hspace{1cm}}\text{ m} + \underline{\hspace{1cm}}\text{ dm} + \underline{\hspace{1cm}}\text{ cm} = \underline{\hspace{1cm}}\text{ cm}$
Distance from alarm to outer door	$\underline{\hspace{1cm}}\text{ m}$	$\underline{\hspace{1cm}}\text{ m} + \underline{\hspace{1cm}}\text{ dm} + \underline{\hspace{1cm}}\text{ cm} = \underline{\hspace{1cm}}\text{ cm}$
Distance from entrance to nearest class	$\underline{\hspace{1cm}}\text{ m}$	$\underline{\hspace{1cm}}\text{ m} + \underline{\hspace{1cm}}\text{ dm} + \underline{\hspace{1cm}}\text{ cm} = \underline{\hspace{1cm}}\text{ cm}$
Length of hallway	$\underline{\hspace{1cm}}\text{ m}$	$\underline{\hspace{1cm}}\text{ m} + \underline{\hspace{1cm}}\text{ dm} + \underline{\hspace{1cm}}\text{ cm} = \underline{\hspace{1cm}}\text{ cm}$

# UNIT 3 LESSON 6

## Objective M5

Identify and write money amounts to \$99.99 relating these to place value concepts.

## Introducing the Lesson

Identify the following coins and bills:



Discuss these money equations noting the importance of ten. By counting, establish the equations.

10 equals

10 equals

10 equals

100 equals

## Teaching the Lesson

Introduce the dollar sign, \$.

For amounts less than \$99.99, have the class practise translating collections of bills and coins into the standard form \$\_\_\_\_\_. Discuss the value of each place in terms of the four types of currency introduced.

Read page 52 together. Explain how values written as cents (235¢) can be represented by sets of money (2 dollars, 3 dimes, and 5 pennies or \$2.35).

Using money and the counting charts, demonstrate:

- counting by s from \$42.86 to \$43.05;
- counting by s from \$42.86 to \$44.26;
- counting by s from \$42.86 to \$52.86;
- counting by s from \$42.86 to \$92.86.

Emphasize the *trading* that occurs. Ask the students to recall the equation associated with each trade. Discuss how counting with money is similar to counting with number blocks.

# Dollars and Cents

ten dollars



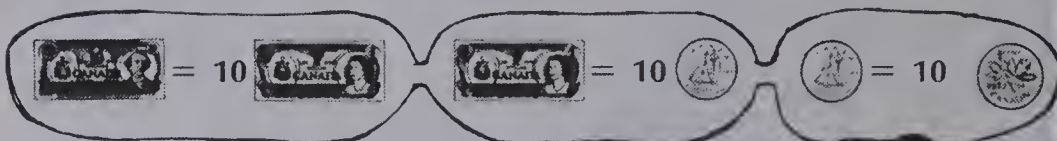
one dollar



ten cents



one cent



62 dollars and 41 cents

\$62.41

Dracula

175¢

\$1.75

1 dollar and 75 cents

## EXERCISES

Use the dollar sign \$.

1. \$32.42

2. \$13.21

3. 275¢  
\$2.75 the Blob

4. \$40.30

5. \$5.04

6. 75¢  
\$0.75 Frankenstein

52


## Using the Exercises


- In questions 1 to 6 an amount of money is shown in two different ways: with bills and coins, and in cents form. The students are to rewrite these amounts with a dollar sign. See that they understand that 75¢ is written as \$0.75.





## PRACTICE


Use the dollar sign \$.


1.  \$12.11

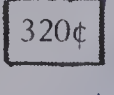
2.  \$10.24

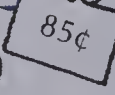
3.  \$41.51

4.  \$23.03



5.  \$2.60



6. Snake-man  \$9.60



7. the Mist  \$3.20



8. the Fly  \$0.85



Complete these equations.



9.  =  10

10.  =  10

11.  =  10

12. 5  =  50

13. 3  =  30

14. 2  =  20

## Creepy Counting

Help the night monsters count their money.

Mummy counts with 1¢'s.

- from \$4.87 to \$5.02
- from \$38.95 to \$39.10

Vampire Bat counts with 10¢'s

- from \$4.87 to \$6.37
- from \$38.95 to \$40.45

Sharkman counts with \$1's.

- from \$4.87 to \$19.87
- from \$38.95 to \$53.95

Headless Horseman counts with \$10's.

- from \$4.87 to \$94.87
- from \$38.95 to \$98.95



53

## Assigning the Practice

Minimum: 1-14

Average: 1-14

Enriched: 1-14

## Reinforcement

1. Assign *Creepy Counting*, page 53. One of the famous Halloween tricks in literature is the ousting of Ichabod Crane from Sleepy Hollow by the father of the girl Ichabod was courting. He dressed up to cover his head and tucked a fierce-looking jack-o-lantern under his arm. Many rural North American communities tell similar tales.

2. Say several amounts of money less than \$99.99. Have the children copy these onto a set of price tags.

3. Establish a classroom store. Provide play money of the denominations discussed (ten dollars, dollars, ten cents, and one cent). Include other coins and bills as these are introduced in the text.

4. Use money stamps to make work cards. Be sure to include problems requiring trading.

18 dimes = \$\_\_\_\_\_

349 cents = \$\_\_\_\_\_

2 dollars, 15 dimes = \$\_\_\_\_\_

5 ten dollars, 17 dollars,

10 dimes, 5 pennies = \$\_\_\_\_\_.

## Enrichment

1. Have the children visit a store and prepare a list of prices using the dollar sign (\$).

2. Let each student decorate a shoe box as a room containing a monster. Then arrange the boxes on a wall in the shape of a haunted house with many rooms.

3. Construct a long spooky tunnel for the students to crawl through from large cardboard boxes. Cut interconnecting doors and sew them together with twine. Place escape hatches along the route. Allow at least a week for the completion of the project.

## Extra Practice

## Worksheet M5

Pages 52-53

Use money materials to complete the counting.

\$5.67, \$5.68, \$5.69, \$5.70, \$5.71, \$5.72, \$5.73

\$2.96, \$2.97, \$2.98, \$2.99, \$3.00, \$3.01, \$3.02

\$13.15, \$13.25, \$13.35, \$13.45, \$13.55, \$13.65, \$13.75

\$8.60, \$8.70, \$8.80, \$8.90, \$9.00, \$9.10, \$9.20

\$26.50, \$27.50, \$28.50, \$29.50, \$30.50, \$31.50, \$32.50

\$10.98, \$20.98, \$30.98, \$40.98, \$50.98, \$60.98, \$70.98

\$15.29, \$20.29, \$25.29, \$30.29, \$35.29, \$40.29, \$45.29

\$5.05, \$6.05, \$7.05, \$8.05, \$9.05, \$10.05, \$11.05

## Objective PS5

Locate information from a picture or table and compare amounts to \$99.99.

## Introducing the Lesson

Review the comparison of numbers to 999. Have the class recall how the process proceeds in descending order (hundreds, tens, ones).

572 < 579 because:

comparing hundreds,	500 = 500;
comparing tens,	70 = 70;
comparing ones,	2 < 9.

Have the students determine which is more:

736 or 742; 605 or 599; 37 or 192.

Have the students determine which is less:

742 or 745; 570 or 190; 65 or 71.

Compose examples for **between**, **least**, and **greatest**.

## Teaching the Lesson

Explain how comparing money to \$99.99 is similar to comparing numbers. "We compare from the greatest to the smallest (ten dollars, one dollar, ten cents, one cent.)"

Ask pupils to find which is more:

\$17.36 or \$17.42; \$26.05 or \$37.09.

Discuss which is less:

\$72.20 or \$74.50; \$5.70 or \$1.90.

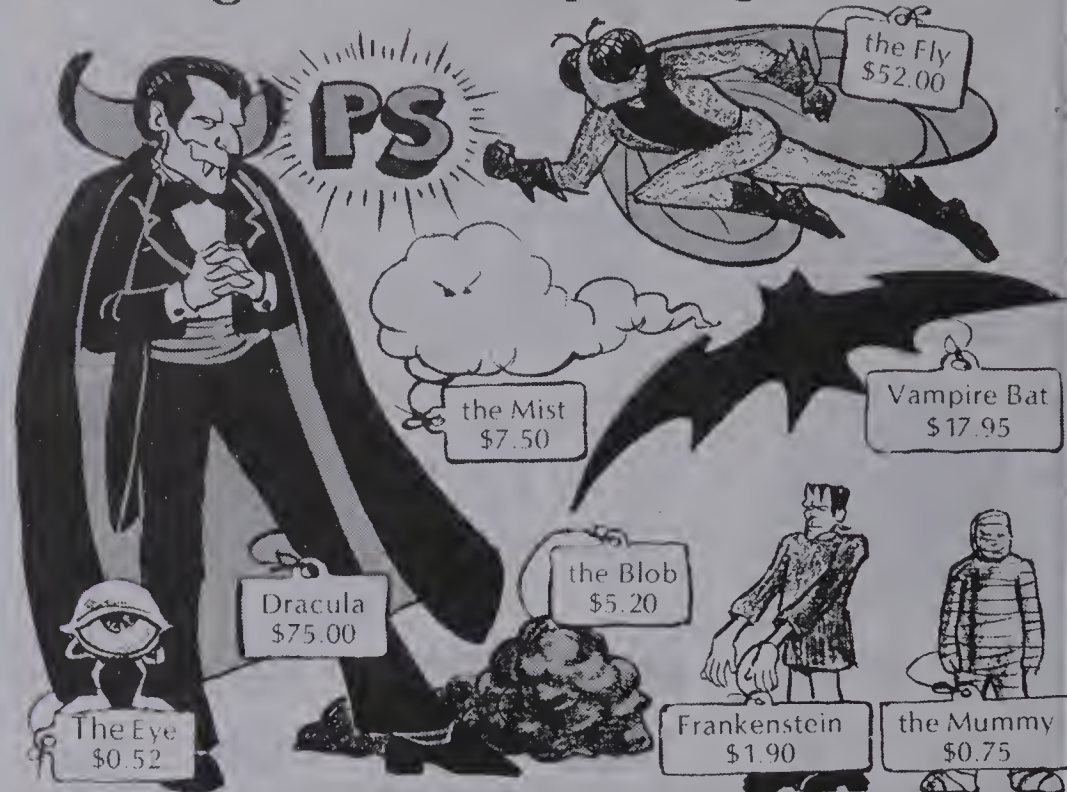
Use page 54 for further examples.

Have the children relate stories about other fantasy monsters.

## Reinforcement

Use items from retail catalogs for comparison activities; collages involving < and >; putting items in order by price; and competitions guessing the nearest to purchase price.

## Finding and Comparing



Which costs **more**?

1. the Mummy or Dracula *Dracula*
2. the Fly or The Eye *the Fly*
3. the Blob or the Mist *the Mist*

Which costs **less**?

4. Frankenstein or the Blob *Frankenstein*
5. Vampire Bat or the Mist *the Mist*
6. the Fly or Dracula *the Fly*

7. Which cost **more** than \$10.00? *Dracula, Vampire Bat, the Fly*

8. Which cost **less** than \$1.00? *the Eye, Mummy*

9. Which cost **between** \$2.00 and \$20.00? *the Blob, the Mist, Vampire Bat*

10. List the monsters from **least** cost to **greatest** cost.  
*the Eye, the Mummy, Frankenstein, the Blob, the Mist, Vampire Bat, the Fly, Dracula*



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----

55

Complete the patterns.

\$10.01, \$9.03, \$8.05, \$7.07, \$6.09, \$5.11, \$4.13

△, □, ⊙, △, □, ⊙      △, □, ⊙, △, □

10, 11, 9, 10, 8, 9, 7, 8, 6, 7

## Pages 54-55

Regroup numbers into standard form and discover recurring patterns.

List things that have a recurring pattern or design: floor and ceiling tiles; the daily schedule; seasons; etc.

Using counting chart paper, show numbers which are not in standard form. Recall that no place value position may have 10 or more; 9 is the largest digit possible. Using place value number blocks, show how to change numbers into standard form by trading as on page 55. 

1	2	14
---	---	----

 $\rightarrow$ 

1	3	4
---	---	---

.

Lead the children to discover the place value translations.

4	+	1	1	2
---	---	---	---	---

 $\rightarrow$ 

5	1	2
---	---	---

Let the students discover the recurring pattern of several geometric sequences. Begin with single factor (shape) patterns.

c.  $\overline{\square} \mid \square \square \square \mid \overline{\square}$        $\_\_\_\_\_\_ ( \mid \square \square \square \mid )$

Finally, investigate double factor (shape, shading) patterns.

f.  $\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} - \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \\ 0 \end{bmatrix}$  \_\_\_\_\_  $(\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} - \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix})$

Let the children invent their own double factor patterns.

To count in base five, use quarters, nickels, and pennies with these trading equations:

5 nickels = 1 quarter.

A 5 should never occur as a digit in base five numerals.

# UNIT 3 LESSON 8

## Objective N7

Read and write numerals to 9999 and count to 9999.

## Introducing the Lesson

Count by hundreds from 0 to 900. Compare the number patterns to determine that 1000 is the next numeral in the counting sequence. Introduce the terms **thousand** and **thousands** place.

Introduce an object to represent 1000 (a  $10 \times 10 \times 10$  block). With the place value number blocks, discuss these equations.

$$10 \square = 1 \text{ —————}$$

$$10 \text{ —————} = 1 \text{ —————}$$

$$10 \text{ —————} = 1 \text{ —————}$$

$10 = 10 \text{ ones}$   
 $100 = 10 \text{ tens}$   
 $1000 = 10 \text{ hundreds}$

## Teaching the Lesson

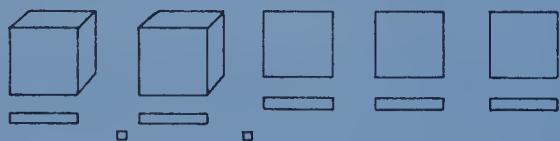
Practise saying and recording numbers in standard form to 9999 using:

### 1. table form cards

10s 0	1s 6	1000s 7	100s 5
----------	---------	------------	-----------

= 7506

### 2. Place value number blocks



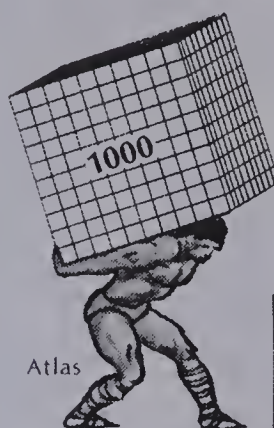
Provide practice in writing standard form numerals from words. Include examples having zero as a place holder.

Use number blocks and counting charts to count from 1400 to 1420, from 4090 to 4110, and from 3995 to 4015.

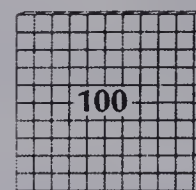
Focus on the trading that occurs. Have the students recall the important trading equations discussed above.

# Thousands

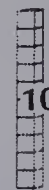
one thousand



one hundred



one ten



one



$$1000 = 10 \text{ hundreds}$$

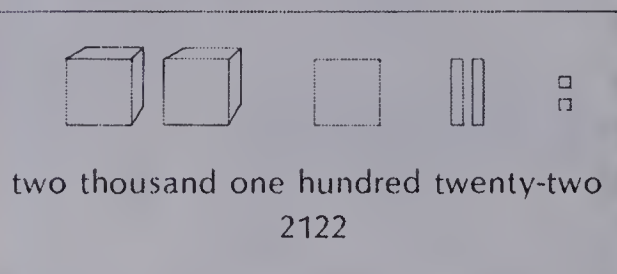
$$100 = 10 \text{ tens}$$

$$10 = 10 \text{ ones}$$

Atlas

Heracles

3497  
3498  
3499  
3500  
3501



## EXERCISES

Write in standard form. Then count ten more.



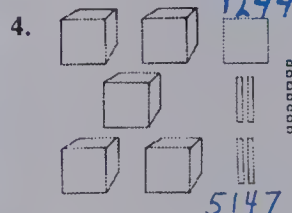
1234  
1244



2026  
2036



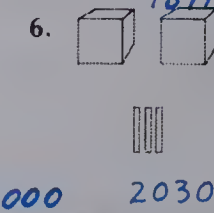
1301  
1311



5147 5157



1990 2000



2030 2040

56

## Using the Exercises

- Questions 1 to 6 give a place value number block representation of four-digit numerals. The children must write the numeral in standard form and then count ten more.



## PRACTICE

Count ten more.

1. 1530 1540
2. 3282 3292
3. 7375 7385
4. 6497 6507
5. 3986 3996
6. 8060 8070
7. 6000 6010
8. 4092 4102
9. 2607 2617
10. 994 1004

Write in standard form.

11. six thousand seven hundred 6700
12. nine thousand fifty-six 9056
13. three thousand eleven 3011
14. one thousand six hundred two 1602
15. four thousand two hundred sixteen 4216
16. two thousand forty 2040

17.

1000	100	10	1
•••	•	•••	••

3142

19.

3604  
Trojan Horse

18.

6274  
Cyclops

## REVIEW

Copy and complete the equations.

1.  $3\text{ m} + 2\text{ dm} + 6\text{ cm} = \square\text{ cm}$  326
2.  $7\text{ m} + 4\text{ cm} = \square\text{ cm}$  704

Use the dollar sign \$.

3. \$1.03
4. 125¢ \$1.25
5. \$24.04

Write in standard form.

6. 1234
7. from 3128 to 3133 3128, 3129, 3130, 3131, 3132, 3133
8. two thousand one 2001

57

## Assigning the Practice

Minimum: 1-16

Average: 1-19

Enriched: 1-19

## Review Exercises

Questions	Objective	Pages
1-2	M4	50-51
3-5	M5	52-53
6-8	N7	56-57

## Reinforcement

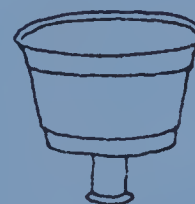
1. Provide a dot-to-dot worksheet requiring counting by ones, tens, or hundreds.
2. Using place value block stamps, make up a set of work cards from which the students must write numerals in standard form. Also write a list of four-digit numerals for students to model using the stamps.
3. Compare four-digit money place value with four-digit number place value.

\$10.00, \$1.00, 10¢, 1¢  
1000, 100, 10, 1

Point out that counting and trading are the same for both. Avoid decimal fraction ideas at this time.

## Enrichment

1. Explain that there are one thousand small spaces on a metre stick that are called millimetres.
2. Discuss how addresses in the neighbourhood are arranged. Have the children put address cards in order on a model of the community.
3. Balance a small tub (e.g., a margarine container) on a spool. Drop popcorn kernels or dry beans into the tub. Let players guess how many kernels or beans can be dropped in before the tub tips over.



## Practice

the numeral.

- three thousand six hundred sixty-three 3663
- two thousand nine hundred seventy 2970
- four thousand seven hundred thirteen 4713
- eight thousand five hundred eight 8508

Complete the counting.

- 1925, 1924, 1923, 1922, 1921, 1920, 1919, 1918, 1917
- 6996, 6997, 6998, 6999, 7000, 7001, 7002, 7003, 7004
- 1940, 1950, 1960, 1970, 1980, 1990, 2000, 2010, 2020
- 6309, 6409, 6509, 6609, 6709, 6809, 6909, 7009, 7109

## Worksheet N7

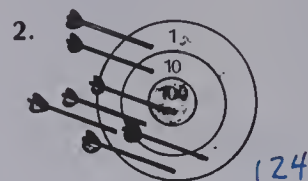
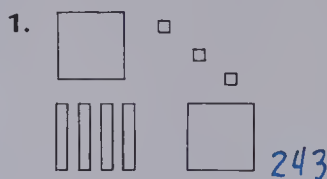
Pages 56-57

Unit 3 Objective	Test Questions	Pages
N3	1-3	42-43
N4	13-17	44-45
N5	4-12	46-47
N6	18-21	48-49
M4	22-23	50-51
M5	24-26	52-53
N7	27-29	56-57

# TEST

# UNIT 3

Write in standard form.



3. six hundred two  
602

4.  $900 + 30 + 8 = 938$

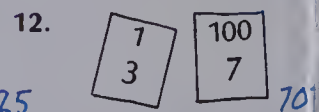
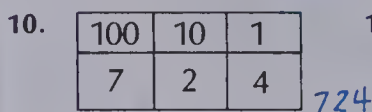
5.  $700 + 20 + 6 = 726$

6.  $3 + 400 + 80 = 483$

7.  $70 + 6 + 300 = 376$

8.  $200 + 70 = 270$

9.  $500 + 6 = 506$



Count.

13. from 182 to 194 14. from 590 to 602 15. from 902 to 914

16. by tens from 142 to 252 17. by hundreds from 104 to 904

Use  $<$  or  $>$ .

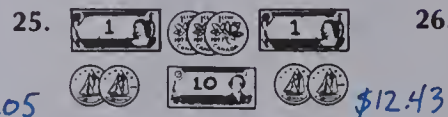
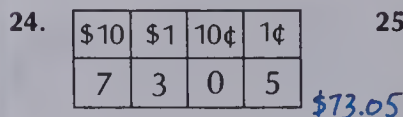
18. 635  $<$  640 19. 799  $<$  804 20. 120  $>$  75 21. 727  $>$  721

Copy and complete the equations.

22.  $3 \text{ m} = 300 \text{ cm}$

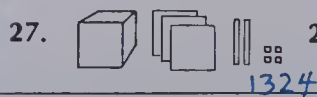
23.  $4 \text{ m} + 6 \text{ dm} + 2 \text{ cm} = 462 \text{ cm}$

Use the dollar sign \$.



26. 235¢  
\$2.35

Write in standard form.

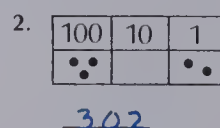


28. from 1658 to 1665  
1658, 1659, 1660, 1661, 1662, 1663, 1664, 1665

29. two thousand four  
2004

## Post-test

Write in standard form



3. one hundred sixteen  
116

4.  $600 + 20 + 4 = 624$

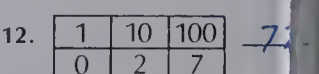
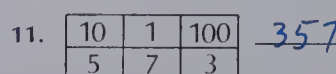
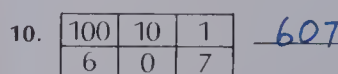
5.  $300 + 10 + 3 = 313$

6.  $400 + 50 = 450$

7.  $700 + 60 + 4 = 764$

8.  $200 + 40 + 1 = 241$

9.  $700 + 4 = 704$



Count.

13. 165, 166, 167, 168, 169, 170, 171

14. 596, 597, 598, 599, 600, 601, 602

15. 886, 887, 888, 889, 890, 891, 892



## SUBTRACTION

Subtract.

1.  $\begin{array}{r} 10 \\ - 3 \\ \hline 7 \end{array}$
2.  $\begin{array}{r} 11 \\ - 6 \\ \hline 5 \end{array}$
3.  $\begin{array}{r} 10 \\ - 5 \\ \hline 5 \end{array}$
4.  $\begin{array}{r} 11 \\ - 8 \\ \hline 3 \end{array}$
5.  $\begin{array}{r} 10 \\ - 1 \\ \hline 9 \end{array}$
6.  $\begin{array}{r} 14 \\ - 9 \\ \hline 5 \end{array}$
7.  $\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$
8.  $\begin{array}{r} 12 \\ - 9 \\ \hline 3 \end{array}$
9.  $\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$
10.  $\begin{array}{r} 15 \\ - 9 \\ \hline 6 \end{array}$
11.  $\begin{array}{r} 12 \\ - 8 \\ \hline 4 \end{array}$
12.  $\begin{array}{r} 13 \\ - 6 \\ \hline 7 \end{array}$
13.  $\begin{array}{r} 12 \\ - 3 \\ \hline 9 \end{array}$
14.  $\begin{array}{r} 13 \\ - 8 \\ \hline 5 \end{array}$
15.  $\begin{array}{r} 12 \\ - 5 \\ \hline 7 \end{array}$
16.  $\begin{array}{r} 14 \\ - 5 \\ \hline 9 \end{array}$
17.  $\begin{array}{r} 16 \\ - 7 \\ \hline 9 \end{array}$
18.  $\begin{array}{r} 15 \\ - 8 \\ \hline 7 \end{array}$
19.  $\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array}$
20.  $\begin{array}{r} 15 \\ - 7 \\ \hline 8 \end{array}$
21.  $\begin{array}{r} 11 \\ - 7 \\ \hline 4 \end{array}$
22.  $\begin{array}{r} 9 \\ - 0 \\ \hline 9 \end{array}$
23.  $\begin{array}{r} 17 \\ - 9 \\ \hline 8 \end{array}$
24.  $\begin{array}{r} 10 \\ - 2 \\ \hline 8 \end{array}$
25.  $\begin{array}{r} 8 \\ - 3 \\ \hline 5 \end{array}$
26.  $\begin{array}{r} 13 \\ - 7 \\ \hline 6 \end{array}$
27.  $\begin{array}{r} 11 \\ - 4 \\ \hline 7 \end{array}$
28.  $\begin{array}{r} 10 \\ - 4 \\ \hline 6 \end{array}$
29.  $\begin{array}{r} 13 \\ - 5 \\ \hline 8 \end{array}$
30.  $\begin{array}{r} 13 \\ - 4 \\ \hline 9 \end{array}$
31.  $\begin{array}{r} 29 \\ - 10 \\ \hline 19 \end{array}$
32.  $\begin{array}{r} 32 \\ - 1 \\ \hline 31 \end{array}$
33.  $\begin{array}{r} 46 \\ - 10 \\ \hline 36 \end{array}$
34.  $\begin{array}{r} 81 \\ - 1 \\ \hline 80 \end{array}$
35.  $\begin{array}{r} 30 \\ - 10 \\ \hline 20 \end{array}$

Solve.

36. 18 masks  
9 spooky 9  
How many are not spooky?
37. 16 bats  
10 fly away. 6  
How many are left?

59

## Informal Materials Assessment

1. The student can translate from place value blocks to oral and written standard form (and vice versa).
2. Using place value blocks the student is able to count by ones (tens, hundreds) to 999 and to identify and explain the *trading* procedure.
3. The student can use the expanded form cards to explain expanded form problems.
4. The student can determine a quantity by the counting on method as described on pages 46-47.
5. The student can perform comparisons using place value materials or the comparison flowchart (monster machine).
6. The student is able to measure lengths with metre, decimetre, and centimetre strips.
7. The student can make amounts up to \$99.99 and can count to \$99.99 using 1¢, 10¢, \$1, or \$10 increments.
8. The student can trade numbers into standard form with materials (page 55).
9. The student can demonstrate the trading equations for 1000.

256, 266, 276, 286, 296, 306, 316

65, 165, 265, 365, 465, 565, 665

< or >.

621 > 497 19. 190 < 201 20. 320 > 319 21. 89 < 103

Complete the equation

2 m + 7 dm + 1 cm = 271 cm 23. 8 m + 3 dm = 830 cm

the dollar sign.

\$10	\$1	10¢	1¢
3	0	4	5

\$30.45

25.  < 

  \$21.23

26. 715¢

\$715

Complete

1000	100	10	1
6	3	4	7

= 6347

28. three thousand two = 3002

4995, 4996, 4997, 4998, 4999, 5000, 5001

# UNIT 4

## Addition

Theme: Transportation

Lesson		Objective	Vocabulary	Materials
Preview		Review sums to 18.	doubles, almost doubles	addition flash cards
1	A10	Add two 2-digit addends without regrouping.	ones, tens, vertical, horizontal	number blocks, dimes, pennies
2	A11	Add 2-digit and 1-digit addends, regrouping ones.	trade, ones, tens	number blocks
3	A12	Add two 2-digit addends, regrouping ones.	trade, ones, tens	number blocks, dimes, pennies
4	M6	Relate kilometres and metres.	metre, kilometre, km, length, distance	local map, metre stick, Vancouver area map
5	A13	Add two 2-digit addends, regrouping tens.	odometer, ones, tens, hundreds, standard form	number blocks, odometer (if possible)
6	A14	Add two 2-digit addends with regrouping.	flow chart	Alberta map, number blocks, dollars, dimes, pennies
7	A15	Add four 1-digit addends with sums to 29.	addends, looking for 10s	
8	M7	Find the perimeters of rectangles and squares by adding.	perimeter, rectangle, square	centimetre rulers, cardboard quadrilaterals (especially squares and rectangles)
Test		Addition		
Review		Numerals to 9999		



# About This Unit

This unit contains a careful step-by-step development of the addition algorithm for two-digit numbers. A thorough treatment of three-digit addition is the subject of Unit 9. This arrangement encourages extensive practice with addition and establishes a built-in review of addition skills which is beneficial for most students in Grade 3.

The only prerequisite for Unit 4 is moderate success with the numeration concepts of Unit 3. It is *not* a requirement that students have mastered the addition facts before beginning Unit 4; in fact, the activities and problems in Unit 4 will assist with an on-going addition facts program. A thoughtful approach, incorporating concrete materials and an addition Fact Master, should enable all students to be successful with the fundamental ideas and skills of Unit 4.

Manipulative materials are absolutely essential and should be available to all students during development and practice of the addition algorithm. The best results are achieved when materials are organized to **model** the addition procedure as closely as possible. Throughout Unit 4 the student's text and teacher's guides emphasize a proven modelling technique. The addition materials suggested consist primarily of place-value manipulatives and addition grids. Experience suggests that students make the transition from concrete manipulations and symbolic recording to fully symbolic manipulation at individual rates.

## Place-Value Materials

Number Blocks 

Coins 

Bundled Sticks 

## Addition Grids

Small chalkboard with tape grids  
Desk tops with tape grids  
Bag board with painted grids


An addition Fact Master (see Unit 1) can be a valuable aid for students who have not mas-

tered the addition facts. Remember: within this unit basic facts errors are worth noting, but are not the focus of concern; rather, the understanding and skillful execution of the addition procedure, as a sequenced process, is the goal. When a fact is felt to have been mastered (3 s recall in a variety of situations), its place on the Fact Master is covered with a sticker. Students may use their personalized Fact Masters only for facts which they consistently find difficult. The other facts will be covered and will have to be reconstructed, if forgotten. As a student's collection of unmastered facts becomes smaller, the teacher is provided with a useful record for preparing focused facts drill and the student is provided with encouraging evidence of progress.

## Ideas

The theme of Unit 4 is *Transportation*. A helper named W.A.L.T. (an acronym for Water, Air, and Land Transportation) appears throughout the unit. W.A.L.T. is a friendly, somewhat eccentric fellow who enjoys language activities such as coded messages and riddles.

1. Display a Canadian map on the bulletin board. Encourage the students to share news stories related to transportation. Indicate the location of the news on the map.
2. Design a travel game using a provincial map. Students move forward on a path by answering addition cards correctly. Encourage them to elaborate upon these rules so that the game *belongs* to them.

Front

35
+26
<hr/>

Back

61
move 3 squares

3. Find a suitable library book on codes and ciphers. Introduce several ciphers by putting coded messages on the board. Supply sufficient hints for the students to crack the code. Allow the students to exchange coded messages during recess and lunch breaks. One type of simple code involves adding an unknown number. For instance, try *adding 5* to every number in the coded message below. Then relate the results to an alphabet.

9-0-14-14-A-2-0-14      A-13-0      B-16-15  
15-13-4-C-6-20!

#### 4. W.A.L.T.'s Transportation Jokes and Riddles

Mary: My poor brother thinks he's an elevator.

Doctor: Send him up. I'll look at him.

Mary: I can't. He doesn't stop at your floor.

*Riddle:* I may run east, west, north, or south but I'm always close to my bank.

*Answer:* A river.

*Nervous passenger:* Do ships like this sink often?

*Captain:* No, only once.

5. A simulation game entitled **Vancouver Buses** is available through the Ministry of Education, in British Columbia.

6. Challenge students to move from BOAT to SAIL by changing one letter at a time. After each change a new, real word must be made. One answer: **boat** coat coal coil soil **sail**.

Here are other challenges with possible solutions.

**bus** but bat cat **car.**

road read reed seed seem stem  
step **stop.**

**tank** sank sand send seed feed  
feel **fuel**.

jet set sat say sky sly fly

**bike** hike hire **fire**

**ship** slip slid said sand **land**

**sled**   slid   slit   slot   slow   **snow**

ship slip slit slot soot sort port

# UNIT 4

## ADDITION I



<b>Unit 4 Objective</b>	<b>Test Questions</b>	<b>Pages</b>
A10	4, 5, 8, 17	62-63
A11	1-3, 10	64-65
A12	6, 7, 9	66-67
M6	11-13	68-69
A13	14-16	70-71
A14	18-23	72-73
A15	24-28	74-75
M7	29-31	76-77

## Pretest

Add.

$$\begin{array}{r} 1. \quad 15 \\ + 6 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 2. \quad 37 \\ + 7 \\ \hline 44 \end{array}$$

$$\begin{array}{r} 3. \quad 47 \\ + 3 \\ \hline 50 \end{array}$$

$$\begin{array}{r} 4. \quad 66 \\ + 3 \\ \hline 69 \end{array}$$

$$\begin{array}{r} 6. \quad 25 \\ + 28 \\ \hline 53 \end{array}$$

$$\begin{array}{r} 7. \quad 18 \\ + 33 \\ \hline 51 \end{array}$$

$$\begin{array}{r} 8. \quad 52 \\ + 46 \\ \hline 98 \end{array}$$

$$\begin{array}{r} 9. \quad 45 \\ + 35 \\ \hline 80 \end{array}$$

Copy and complete.

11.  $1 \text{ km} = \underline{1000} \text{ m}$

12. 5 km = 5000 m

13.  $4 \text{ km} = \underline{4000}$

Add.

14. 
$$\begin{array}{r} 93 \\ + 92 \\ \hline 185 \end{array}$$

$$\begin{array}{r} 15. \quad 40 \\ + 79 \\ \hline 119 \end{array}$$

16. 
$$\begin{array}{r} 73 \\ + 73 \\ \hline 146 \end{array}$$

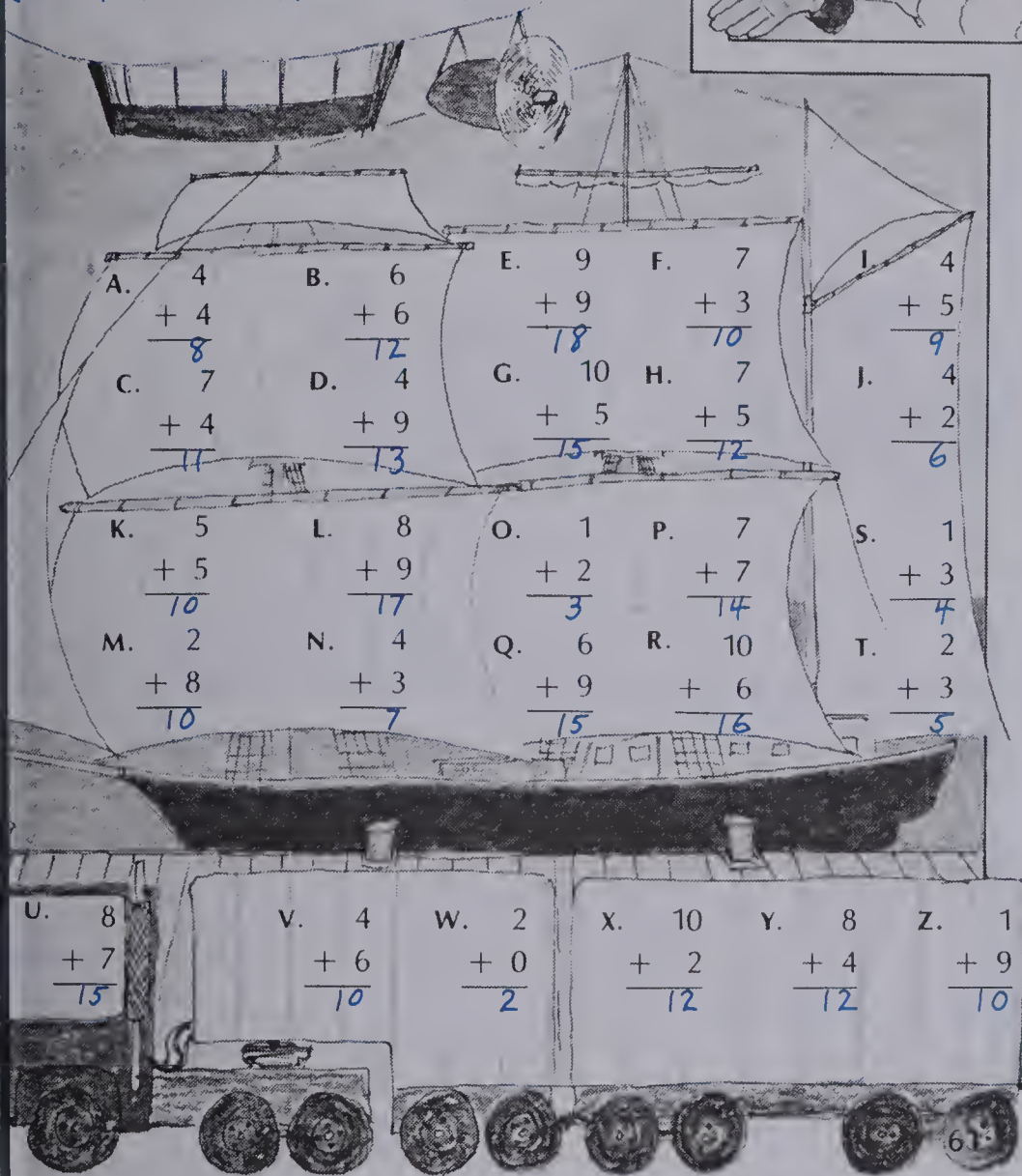
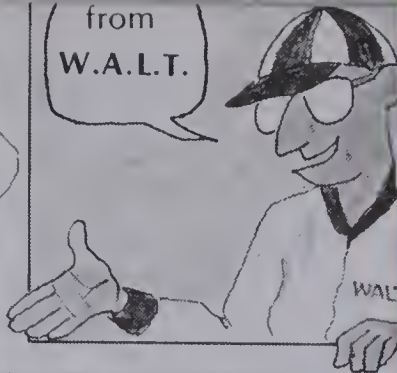
$$\begin{array}{r} 17. \quad 41 \\ + 56 \\ \hline 97 \end{array}$$



# A Moving Message

8 5 18 16 8 9 16 17 8 7 13  
A T E R A I R L A N D  
16 8 7 4 14 3 16 5 8 5 9 3 7  
R A N S P O R T A T I O N

from  
W.A.L.T.



## UNIT 4 PREVIEW

### Suggestions

Decipher the following message by working the questions together.

17 11-15 13-11-9-19

A. 6 B. 4 I. 8 L. 4  
+5 +3 +9 +5  
M. 7 O. 3 T. 10 W. 7  
+8 +2 +9 +6

Identify the additions as *almost-doubles*. Relate each to a smaller doubles fact: since  $5+5=10$ , then  $6+5=11$ . Then use the answers and letters to complete the message: *I am Walt*. Point out to the students that B and O are not used since 7 and 5 are not in the coded message, but that A is used twice.

Explain that Walt is going to appear throughout this addition unit as a helper. W.A.L.T. is an acronym for **W**ater, **A**ir, and **L**and **T**ransportation.

Using the picture on page 61, discuss the modes of transportation available in Canada.

### About the Page

Make certain that the students use letters rather than numerals to designate the addition problems on page 61 and throughout this unit.

Walt's message: Water, Air, Land Transportation.

### Reinforcement

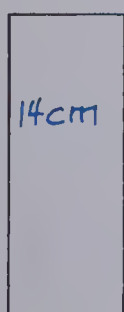
Draw a tick-tack-toe grid on a truck-shaped game board. One player gets five tokens bearing the numerals 1, 3, 5, 7, and 9 and the second gets five tokens bearing the numerals 2, 4, 6, 8, and 10. The tokens are used by the players instead of xs and os. The players take turns placing tokens on the grid. The first player to create a sum to 15 in any direction — across, down, or diagonally — is the winner.

		3	1	
--	2	8	5	--

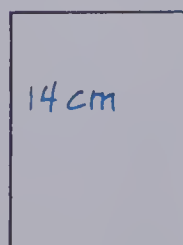
85 +85 <u>170</u>	20. 79 +54 <u>133</u>	21. 98 +7 <u>105</u>	22. 47 +53 <u>100</u>	23. 54 +59 <u>113</u>
6 5 2 +3 <u>16</u>	25. 7 7 7 +7 <u>28</u>	26. 8 7 5 +6 <u>26</u>	27. 20 20 30 +70 <u>140</u>	28. 50 90 20 +80 <u>240</u>

Measure and add to find each perimeter.

30.



31.



## Objective A10

Add two 2-digit addends without regrouping.

## Introducing the Lesson

Print 24, 32, 55, and 41 on the chalkboard. Build each of these numbers with number blocks. Discuss which digits represent ones and which represent tens.

Have the students point to the places of the numerals and review the value of ones and tens. Refer to the number blocks if a student has difficulty.

## Teaching the Lesson

Review that  $4 + 2$  can be written vertically as

$$\begin{array}{r} 4 \\ +2 \\ \hline \end{array}$$

Ask how  $24 + 32$  would appear in vertical form. Give the students several examples for which they must change the written form (from horizontal to vertical or from vertical to horizontal).

Carefully point out the difference between incorrect and correct alignment.

Incorrect:

$$\begin{array}{r} 32 \\ +24 \\ \hline \end{array} \text{ or } \begin{array}{r} 32 \\ +24 \\ \hline \end{array}$$

Correct:

$$\begin{array}{r} 32 \\ +24 \\ \hline \end{array}$$

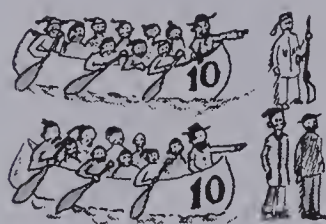
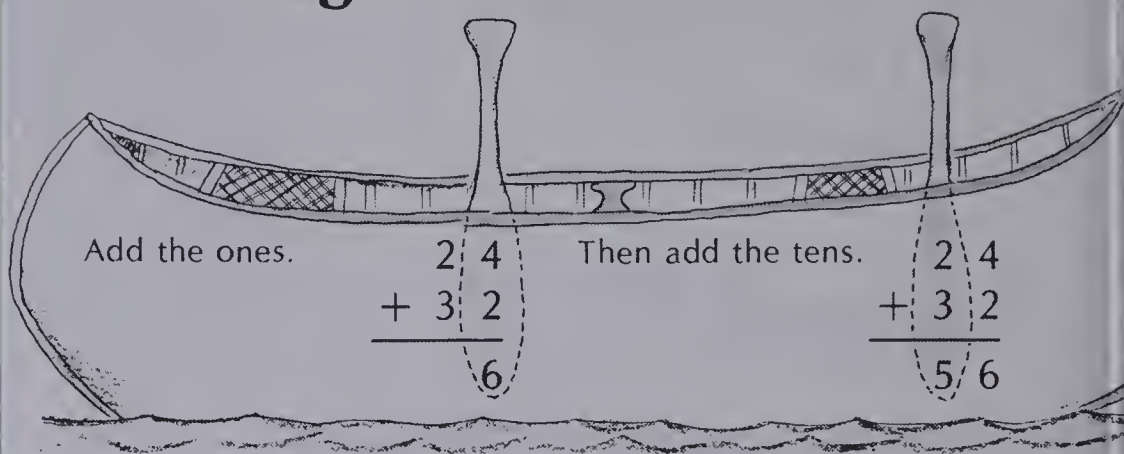
Explain that the ones are in the first column and the tens are in the second column.

Show how to find the sum with two-digit addends by first adding the ones and then adding the tens as shown on page 62. Let someone model this procedure several times using blocks or dimes and pennies.

$$\begin{array}{r} 32 \\ +24 \\ \hline \end{array}$$



## Two-Digit Addends



$$\begin{array}{r} 23 \\ +16 \\ \hline \end{array}$$

23 explorers and 16 explorers equal 39 explorers.

## EXERCISES

Add.

- |  |  |  |  |  |
|--|--|--|--|--|
| 1. $\begin{array}{r} 34 \\ +12 \\ \hline 46 \end{array}$ | 2. $\begin{array}{r} 52 \\ +13 \\ \hline 65 \end{array}$ | 3. $\begin{array}{r} 20 \\ +32 \\ \hline 52 \end{array}$ | 4. $\begin{array}{r} 36 \\ +30 \\ \hline 66 \end{array}$ | 5. $\begin{array}{r} 32 \\ +37 \\ \hline 69 \end{array}$ |
| 6. $\begin{array}{r} 40 \\ +26 \\ \hline 66 \end{array}$ | 7. $\begin{array}{r} 43 \\ +16 \\ \hline 59 \end{array}$ | 8. $\begin{array}{r} 40 \\ +6 \\ \hline 46 \end{array}$  | 9. $\begin{array}{r} 43 \\ +6 \\ \hline 49 \end{array}$  | 10. $\begin{array}{r} 7 \\ +31 \\ \hline 38 \end{array}$ |
| 11. 20 and 40 <b>60</b>                                  | 12. 70 and 11 <b>81</b>                                  | 13. 31 and 25 <b>56</b>                                  |  |  |
| 14. 12 and 54 <b>66</b>                                  | 15. 7 and 30 <b>37</b>                                   | 16. 23 and 4 <b>27</b>                                   |  |  |

## Using the Exercises

- Questions 1 to 7 involve two-digit addends without trading.
- Questions 8 to 10 give practice in properly aligning the ones and tens.
- Questions 11 to 16 require changing from horizontal format to vertical format before adding.



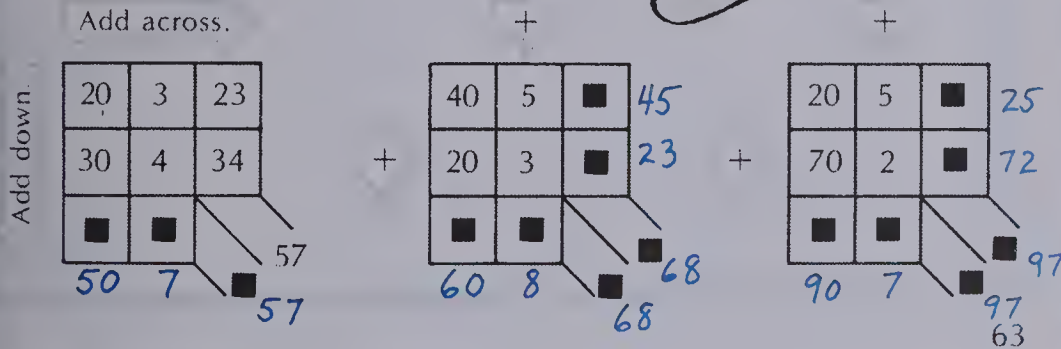
# PRACTICE

Add.

- A.  $\begin{array}{r} 50 \\ + 38 \\ \hline 88 \end{array}$  B.  $\begin{array}{r} 27 \\ + 12 \\ \hline 39 \end{array}$  C.  $\begin{array}{r} 24 \\ + 24 \\ \hline 48 \end{array}$  D.  $\begin{array}{r} 63 \\ + 21 \\ \hline 84 \end{array}$  E.  $\begin{array}{r} 84 \\ + 15 \\ \hline 99 \end{array}$
- F.  $\begin{array}{r} 16 \\ + 73 \\ \hline 89 \end{array}$  G.  $\begin{array}{r} 70 \\ + 20 \\ \hline 90 \end{array}$  H.  $\begin{array}{r} 18 \\ + 41 \\ \hline 59 \end{array}$  I.  $\begin{array}{r} 30 \\ + 40 \\ \hline 70 \end{array}$  J.  $\begin{array}{r} 32 \\ + 42 \\ \hline 74 \end{array}$
- K.  $\begin{array}{r} 50 \\ + 29 \\ \hline 79 \end{array}$  L.  $\begin{array}{r} 41 \\ + 51 \\ \hline 92 \end{array}$  M.  $\begin{array}{r} 50 \\ + 40 \\ \hline 90 \end{array}$  N.  $\begin{array}{r} 72 \\ + 22 \\ \hline 94 \end{array}$  O.  $\begin{array}{r} 23 \\ + 60 \\ \hline 83 \end{array}$
- P.  $\begin{array}{r} 50 \\ + 8 \\ \hline 58 \end{array}$  Q.  $\begin{array}{r} 63 \\ + 5 \\ \hline 68 \end{array}$  R.  $\begin{array}{r} 70 \\ + 7 \\ \hline 77 \end{array}$  S.  $\begin{array}{r} 5 \\ + 52 \\ \hline 57 \end{array}$  T.  $\begin{array}{r} 9 \\ + 80 \\ \hline 89 \end{array}$
- U. 17 and 21 **38** V. 50 and 37 **87** W. 60 and 7 **67**
- X.  $43 + 46$  **89** Y.  $80 + 13$  **93** Z.  $35 + 20$  **55**

48 88 94 93 83 38 58 88 84 84 92 99 ?  
CAN YOU PADDLE

## Can You Do These?



## Assigning the Practice

Minimum: A-Z

Average: A-Z

Enriched: A-Z

## Reinforcement

1. Assign *Can You Do These?* on page 63. Show how to set up and do several similar problems. For setup, first copy the frame and then the numbers.

2. Introduce addition drill patterns using work cards cut into paddle shapes.

3. Show ways in which the 100 chart can be used to add 2-digit numbers without regrouping. For example, to do  $43 + 24$  first locate 43, then count 4 to the right (to 47) and, finally, 2 down (to 67). Review previous work with the 100 chart to discuss this method. Investigate adding ones first and tens next.

31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70

## Enrichment

1. Discuss the play on words found on page 63.

2. Explain how to add two-digit numbers left in horizontal form.

$$52 + 36 = \blacksquare$$

$$\text{Add the ones. } 52 + 36 = \blacksquare 8$$

$$\text{Add the tens. } 52 + 36 = 88$$

3. Prepare work cards with problems involving missing numerals.

$$\blacksquare 3$$

$$+ 62$$

$$85$$

$$3 \blacksquare$$

$$+ \blacksquare 7$$

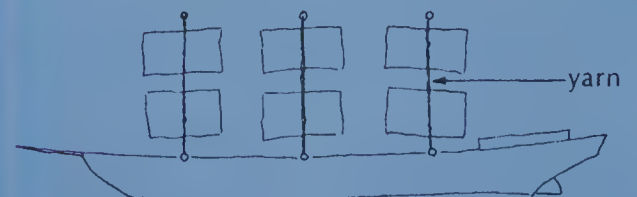
$$99$$

$$\blacksquare 4$$

$$+ 3 \blacksquare$$

$$76$$

4. On a bulletin board make a sailing vessel with index-card sails and yarn masts. Use paper clips to attach an addition exercise on the front of each sail. Put the answer on the back.



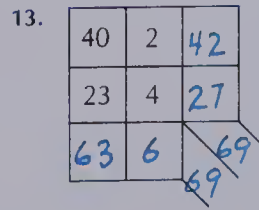
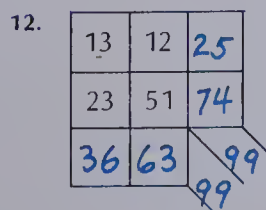
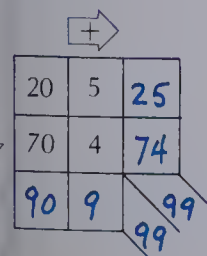
## Extra Practice

## Worksheet A10

Pages 62-63

Add.

1.  $\begin{array}{r} 4 \text{ tens} \\ + 2 \text{ tens} \\ \hline 6 \text{ tens} \end{array}$  2.  $\begin{array}{r} 5 \text{ ones} \\ + 4 \text{ ones} \\ \hline 9 \text{ ones} \end{array}$  3.  $\begin{array}{r} 2 \text{ tens} \\ + 7 \text{ tens} \\ \hline 9 \text{ tens} \end{array}$  4.  $\begin{array}{r} 4 \text{ ones} \\ + 3 \text{ ones} \\ \hline 7 \text{ ones} \end{array}$  5.  $\begin{array}{r} 6 \text{ tens} \\ + 2 \text{ tens} \\ \hline 8 \text{ tens} \end{array}$
6.  $\begin{array}{r} 43 \\ + 24 \\ \hline 67 \end{array}$  7.  $\begin{array}{r} 24 \\ + 75 \\ \hline 99 \end{array}$  8.  $\begin{array}{r} 23 \\ + 44 \\ \hline 67 \end{array}$  9.  $\begin{array}{r} 44 \\ + 25 \\ \hline 69 \end{array}$  10.  $\begin{array}{r} 56 \\ + 33 \\ \hline 89 \end{array}$



### Objective A11

Add two-digit and one-digit addends, regrouping ones.

### Introducing the Lesson

Have the students recall addition facts with two-digit sums, like  $6 + 9 = 15$ . Point out that 15 ones can be **traded** for 1 ten and 5 ones.

### Teaching the Lesson

Set up the problem  $35 + 8$  on an addition grid with number blocks (or other place-value materials) and on the board in vertical form.



Relate the sum of the ones to the combined number of cubes (13). Recall that the ones place cannot contain more than 9. Trade 10 cubes (ones) for 1 rod (ten) and place it in the tens place. Record the 3 ones and



the 1 ten traded on the board. Record the 4 rods (tens).

Point out and discuss the example on page 64. Model several other addition examples using grids and blocks.

Practise putting addition problems into vertical form from the horizontal form. Have the students recall the arguments for proper alignment based on place value.

Finish the following problems together.

■	■			
$\begin{array}{r} 54 \\ + 9 \\ \hline 3 \end{array}$	$\begin{array}{r} 33 \\ + 8 \\ \hline 1 \end{array}$	$\begin{array}{r} 35 \\ + 7 \\ \hline 2 \end{array}$	$\begin{array}{r} 68 \\ + 7 \\ \hline 5 \end{array}$	$\begin{array}{r} 73 \\ + 2 \\ \hline \end{array}$ ■

## Two-Digit Addends

Add the ones.

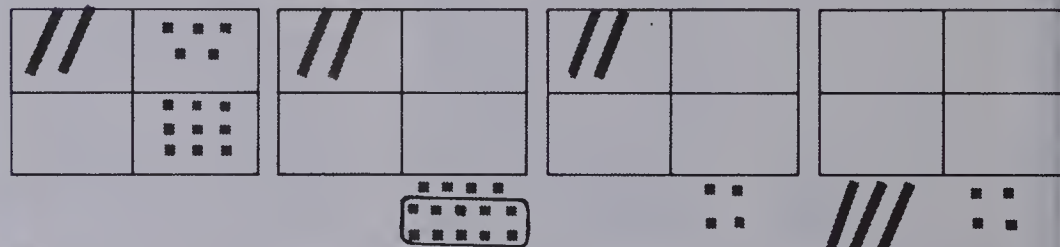
$$\begin{array}{r} 25 \\ + 9 \\ \hline \end{array}$$

Place value trade.

$$\begin{array}{r} \boxed{1} \\ 25 \\ + 9 \\ \hline 4 \end{array}$$

Add the tens.

$$\begin{array}{r} \boxed{1} \\ 25 \\ + 9 \\ \hline 34 \end{array}$$



EXERCISES

Finish adding.

1.
$$\begin{array}{r} 14 \\ + 9 \\ \hline 23 \end{array}$$

2.
$$\begin{array}{r} 25 \\ + 6 \\ \hline 31 \end{array}$$

3.
$$\begin{array}{r} 46 \\ + 6 \\ \hline 52 \end{array}$$

4.
$$\begin{array}{r} 39 \\ + 2 \\ \hline 41 \end{array}$$

5.
$$\begin{array}{r} 23 \\ + 2 \\ \hline 25 \end{array}$$

6.
$$\begin{array}{r} 29 \\ + 6 \\ \hline 35 \end{array}$$

7.
$$\begin{array}{r} 32 \\ + 0 \\ \hline 32 \end{array}$$

8.
$$\begin{array}{r} 39 \\ + 3 \\ \hline 42 \end{array}$$

9.
$$\begin{array}{r} 42 \\ + 2 \\ \hline 44 \end{array}$$

10.
$$\begin{array}{r} 45 \\ + 9 \\ \hline 54 \end{array}$$

11.
$$\begin{array}{r} 21 \\ + 2 \\ \hline 23 \end{array}$$

12.
$$\begin{array}{r} 26 \\ + 7 \\ \hline 33 \end{array}$$

64

### Using the Exercises

- Questions 1 to 4 have been started and need to have the traded ten added to the other tens.
- Questions 5 to 12 include some problems that require trading.



# PRACTICE

Add.

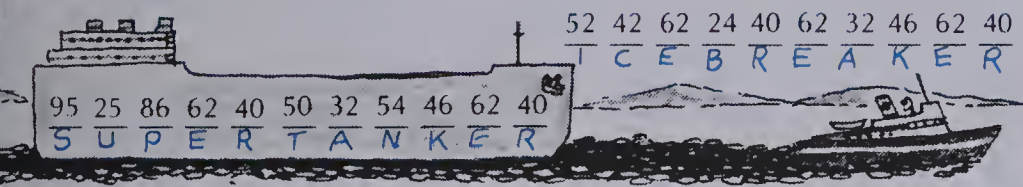
A.  $\begin{array}{r} 24 \\ + 8 \\ \hline 32 \end{array}$       B.  $\begin{array}{r} 19 \\ + 5 \\ \hline 24 \end{array}$       C.  $\begin{array}{r} 36 \\ + 6 \\ \hline 42 \end{array}$       D.  $\begin{array}{r} 42 \\ + 9 \\ \hline 51 \end{array}$       E.  $\begin{array}{r} 58 \\ + 4 \\ \hline 62 \end{array}$

F.	35	G.	27	H.	15	I.	45	J.	79
	+ 9		+ 8		+ 6		+ 7		+ 4
	<u>44</u>		<u>35</u>		<u>21</u>		<u>52</u>		<u>83</u>

K.	38	L.	22	M.	53	N.	47	O.	59
	+ 8		+ 4		+ 4		+ 7		+ 9
	<u>46</u>		<u>26</u>		<u>57</u>		<u>54</u>		<u>68</u>

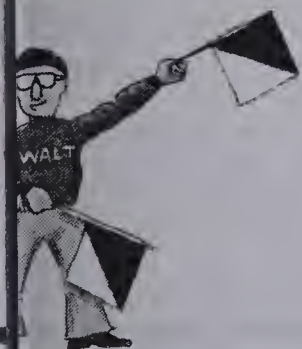
P.	83	Q.	19	R.	33	S.	91	T.	45
	+ 3		+ 7		+ 7		+ 4		+ 5
	<u>86</u>		<u>26</u>		<u>40</u>		<u>95</u>		<u>50</u>


U.  $19 + \frac{6}{25}$     V.  $38 + \frac{7}{45}$     W.  $76 + \frac{6}{82}$     X.  $6 + \frac{22}{28}$     Y.  $7 + \frac{77}{84}$



## What Comes Next?

Keep these patterns going.



1. 

65

## Assigning the Practice

Minimum: A-Y

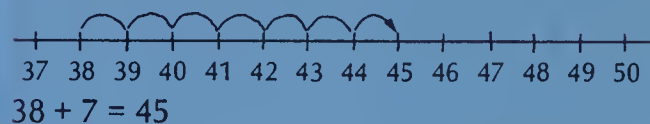
Average: A-Y

Enriched: A-Y

## Reinforcement

**1.** Use a 100 chart to add two-digit and one-digit numerals. Develop a procedure with the chart for adding nine (add 10, subtract 1) and adding 8 (add 10, subtract 2). (See Reinforcement, page 63.)

**2. Add, using a number line to 100 (such as a metre ruler).**



**3. Prepare various addition tables for further practice.**

+	35	36	37	38	
4					
5					

4. Prepare dot-to-dot worksheets for counting (by 6s, 7s, 8s, or 9s).

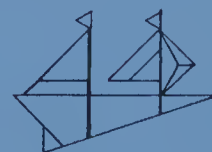
## Enrichment

## 1. Assign *What Comes Next?*

**2.** Prepare an addition paddle boat on poster board. With a metal fastener attach two concentric discs of addends, one with numbers to 10 and the other with two-digit numbers. Several of the smaller sized discs bearing different two-digit numbers can be made to be detached and exchanged.



**3.** Have the students find at least 12 triangles in the sailboat.



**4.** Have students write short reports on a particular type of ship, such as, an ice breaker, barge, tug boat, container ship, ferry, tanker, grain freighter, submarine, aircraft carrier, hydro-foil, etc.

## Extra Practice

complete.

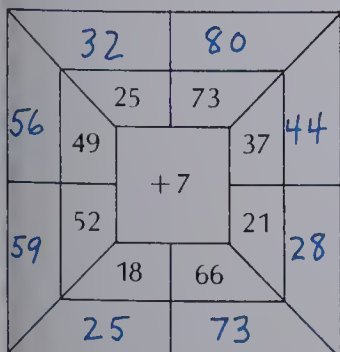
$$\begin{array}{r} 35 \\ + 7 \\ \hline 42 \end{array}$$

$$\begin{array}{r} 2. \quad 27 \\ + 7 \\ \hline 34 \end{array}$$

$$\begin{array}{r} 3. \quad 53 \\ + 7 \\ \hline 60 \end{array}$$

$$\begin{array}{r} 4. \quad 19 \\ + 7 \\ \hline 26 \end{array}$$

$$\begin{array}{r} 5. \quad 48 \\ + 7 \\ \hline 55 \end{array}$$



7.	19		45
	26		52
	33	Count by 7's	59
	40		66
	47		73
	54		80

## Worksheet A11

Pages 64-65

# UNIT 4 LESSON 3

## Objective A12

Add two 2-digit addends, regrouping ones.

### Introducing the Lesson

Review addition involving three addends. Vary the problems according to these formats.

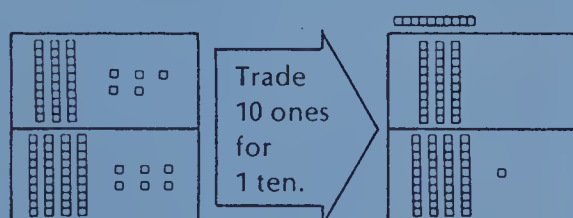
1	1 ten	10
3	5 tens	20
+4	+2 tens	+40

### Teaching the Lesson

Supply each student with an addition grid and place-value materials (blocks or coins). The grids can be made on small chalkboards, desks, or poster board as described in *About This Unit*. Following the procedure outlined on page 66, work these problems.

35	19	17
+46	+29	+51

For example:



Have the students notice that not all practice problems require trading. Write the examples below on the chalkboard. Have the students find their sums without materials. Discuss each step carefully.

24	46	38	32	37	23
+19	+16	+27	+43	+19	+15
3	2	5	5		

Investigate what happens if the tens are added first. With coins, discuss how trading might be shown.

$38¢ + 27¢ \rightarrow 5 \text{ dimes } 15 \text{ pennies} \rightarrow 65¢$

Students having difficulty with regrouping should use manipulatives such as coins. They can translate questions into place-value form.

34	3 tens	4 ones
+27	+2 tens	7 ones
5 tens 11 ones $\rightarrow$ 6 tens 1 one $\rightarrow$ 61		

## Two-Digit Addends

Add the ones.

Place value trade.

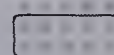
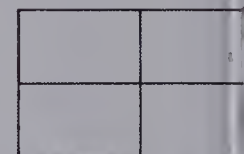
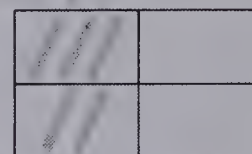
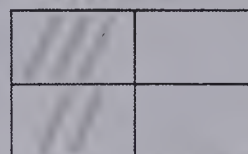
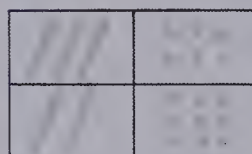
Add the tens.

$$\begin{array}{r} 36 \\ + 29 \\ \hline \end{array}$$

$$\begin{array}{r} 36 \\ + 29 \\ \hline \end{array}$$

$$\begin{array}{r} \boxed{1} \\ 36 \\ + 29 \\ \hline 5 \end{array}$$

$$\begin{array}{r} \boxed{1} \\ 36 \\ + 29 \\ \hline 65 \end{array}$$



### EXERCISES

Finish adding.

$$\begin{array}{r} 14 \\ + 39 \\ \hline 53 \end{array}$$

$$\begin{array}{r} 25 \\ + 16 \\ \hline 41 \end{array}$$

$$\begin{array}{r} 46 \\ + 26 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 39 \\ + 22 \\ \hline 61 \end{array}$$

$$\begin{array}{r} 23 \\ + 42 \\ \hline 65 \end{array}$$

$$\begin{array}{r} 29 \\ + 46 \\ \hline 75 \end{array}$$

$$\begin{array}{r} 32 \\ + 30 \\ \hline 62 \end{array}$$

$$\begin{array}{r} 39 \\ + 33 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 42 \\ + 12 \\ \hline 54 \end{array}$$

$$\begin{array}{r} 45 \\ + 19 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 21 \\ + 42 \\ \hline 63 \end{array}$$

$$\begin{array}{r} 26 \\ + 47 \\ \hline 73 \end{array}$$

66

### Using the Exercises

- Questions 1 to 12 follow a developmental pattern similar to page 64. On page 66 both addends have two digits.



## PRACTICE

Add.

A. 28 + 34 <hr/> 62	B. 28 + 19 <hr/> 47	C. 39 + 28 <hr/> 67	D. 37 + 39 <hr/> 76	E. 46 + 27 <hr/> 73
F. 56 + 36 <hr/> 92	G. 25 + 57 <hr/> 82	H. 31 + 29 <hr/> 60	I. 44 + 49 <hr/> 93	J. 16 + 18 <hr/> 34
K. 32 + 24 <hr/> 56	L. 36 + 5 <hr/> 41	M. 48 + 13 <hr/> 61	N. 62 + 5 <hr/> 67	O. 78 + 12 <hr/> 90
P. 38 + 46 <hr/> 84	Q. 43 + 23 <hr/> 66	R. 15 + 28 <hr/> 43	S. 86 + 5 <hr/> 91	T. 46 + 3 <hr/> 49

U.  $22 + 1941$  V.  $15 + 4661$  W.  $13 + 3851$

X.  $16 + 7187$  Y.  $6 + 7783$  Z.  $25 + 5580$

76 90 73 91  
D O E S

51 62 41 49  
W A L T

82 90  
G O

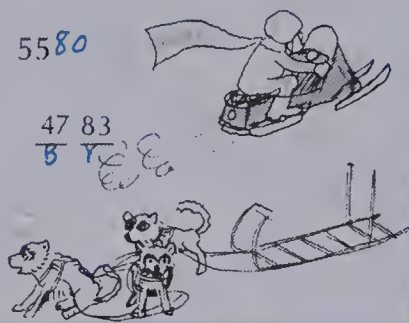
47 83  
B Y

76 90 82  
D O G

91 41 73 76  
S L E D

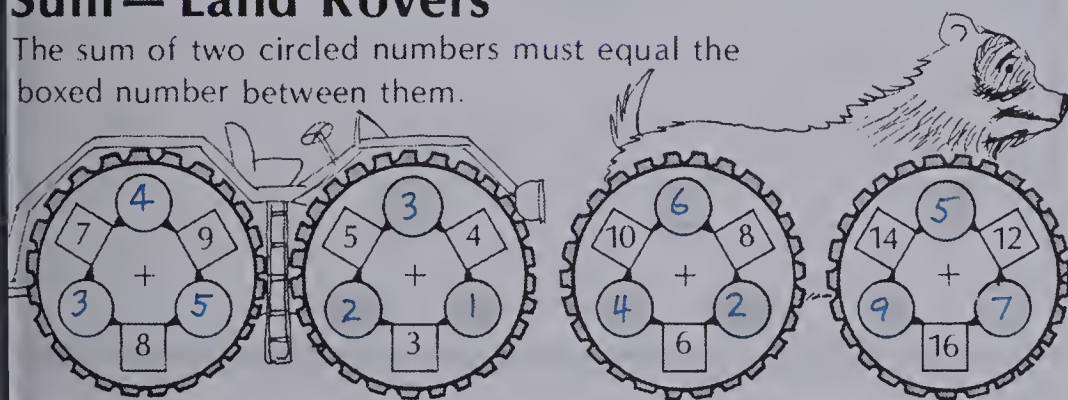
90 43  
O R

91 67 90 51 61 90 47 93 41 73?  
S N O W M O B I L E



## Sum — Land Rovers

The sum of two circled numbers must equal the boxed number between them.



67

## Extra Practice

Solve those needing trading. Then add.

32  
+ 57  

---

89

2. 12  
+ 58  

---

70

3. 57  
+ 36  

---

93

4. 75  
+ 23  

---

98

5. 29  
+ 56  

---

85

82  
+ 9  

---

91

7. 73  
+ 16  

---

89

8. 37  
+ 26  

---

63

9. 26  
+ 56  

---

82

10. 25  
+ 25  

---

50

23 32 55  
18 19 37  
41 51 92  
92

12. 17 16 33  
25 31 56  
42 47 89  
89

13. 38 56 94  
49 19 68  
87 75 162  
162

## Worksheet A12

Pages 66-67

## Assigning the Practice

Minimum: A-Z

Average: A-Z

Enriched: A-Z

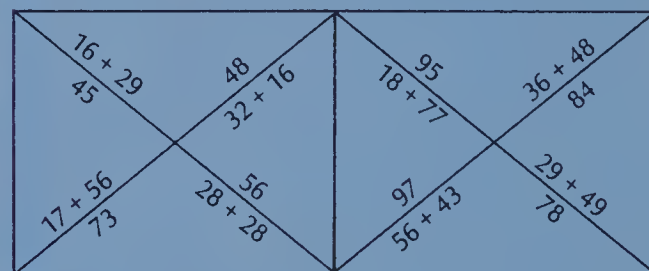
## Reinforcement

1. For children having difficulty with addition problems, determine the type of error: trading (regrouping), place-value alignment, basic facts, or three-addend addition. Aids or visual crutches which permit concentration on specific errors should be made available. For example, addition partitions sometimes help remediation of the first two difficulties.



2. With the 100 chart perform two-digit addition. Use the method introduced on page 63.

3. Have the students cut out this puzzle and then paste it back together again on stiff paper.



## Enrichment

1. Compare these words: sum and some; land rover as a vehicle and Rover as a dog's name. Assign *Sum-Land Rovers* on page 67. Prepare the students by discussing some similar problems.

2. Prepare a cardboard *Sum-Land Rover* and a collection of spare wheels. Investigate strategies for solving these addition puzzles.

3. Discuss the types of transportation used in snowbound regions. As a science activity, challenge the students to design a vehicle to be used on Arctic ice floes.

# UNIT 4 LESSON 4

## Objective M6

Relate kilometres and metres.

### Introducing the Lesson

Ask the students to recall the length of one centimetre and one metre using the width of a fingertip and a metre stick as models. Point out several objects that can be seen in the classroom or outside (door, chalkboard, ceiling, playground, pencil, book, eraser, etc.). Decide whether measuring their lengths in centimetres or metres would be more appropriate.

### Teaching the Lesson

Ask which unit of measure might be used to measure the *distances* between towns. Decide that centimetres and metres are both unsuitable. Introduce the word *kilometre* (kil'-o-metre) and symbol km.

Display and discuss a map of your locale. Show the students how to identify places, paths, and distances on this map. Ask questions which require addition with 2 and 3 addends. Make certain that the proper unit of measure labels each answer.

Have the students recall that  $100 \text{ cm} = 1 \text{ m}$ . Have them suggest how many metres equal 1 km. Print  $1000 \text{ m} = 1 \text{ km}$  on the board. Discuss distances in your immediate surroundings that are close to 1 km.

Do the following examples together. Have each equation read aloud.

$$\begin{array}{ll} 7 \text{ km} = \blacksquare \text{ m} & 4 \text{ km} = \blacksquare \text{ m} \\ \blacksquare \text{ km} = 1000 \text{ m} & \blacksquare \text{ km} = 8000 \text{ m} \end{array}$$

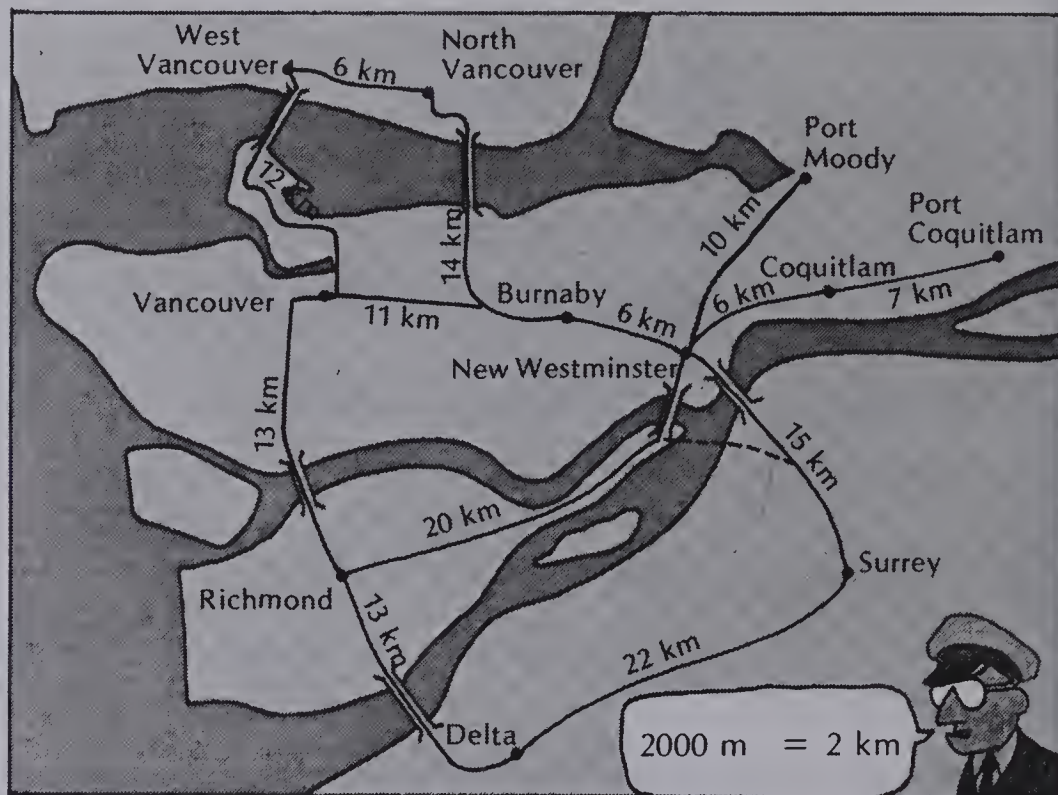
Show the students where Vancouver is located on a map. Name the cities around Vancouver as shown on page 68. Explain that the distances shown are those by bus from one municipal (city) hall to another.

## Kilometre

A **kilometre** is 1000 metres.

$$1 \text{ km} = 1000 \text{ m}$$

The distance between cities can be measured in kilometres.



### EXERCISES

Complete the equations.

1.  $4 \text{ km} = \blacksquare \text{ m}$  2.  $9 \text{ km} = \blacksquare \text{ m}$  3.  $6 \text{ km} = \blacksquare \text{ m}$
4.  $\frac{\blacksquare}{7} \text{ km} = 7000 \text{ m}$  5.  $\frac{\blacksquare}{3} \text{ km} = 3000 \text{ m}$  6.  $\frac{\blacksquare}{5} \text{ km} = 5000 \text{ m}$
7. How many kilometres from Vancouver to Richmond?  $13 \text{ km}$
8. How many kilometres from Burnaby to Coquitlam?  $12 \text{ km}$

### Using the Exercises

- Questions 1 to 6 ask the students to change from metres to kilometres and vice versa.
- Questions 7 and 8 require them to refer to the map on page 68 for the given distances.



## PRACTICE

Complete the equations.

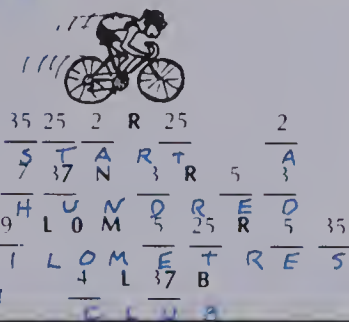
- A. 2000 m = 2 km B. 8 km = 8000 m C. 4 km = 4000 m  
 D. 3 km = 3000 m E. 5000 m = 5 km F. 6 km = 6000 m  
 G. 5 km = 5000 m H. 7 km = 7000 m I. 9 km = 9000 m

Which unit would you use?

- J. length of pencil cm L. width of camera cm  
 M. width of room m N. length of hall m O. length of river km  
 P. height of chair cm Q. distance to lake km R. distance to road km

How many kilometres? Show your work.

- S. Surrey to Richmond 35 km  
 T. Richmond to West Vancouver 25 km  
 U. Delta to Burnaby 37 km  
 V. Surrey to Coquitlam 21 km  
 W. New Westminster to Vancouver 17 km



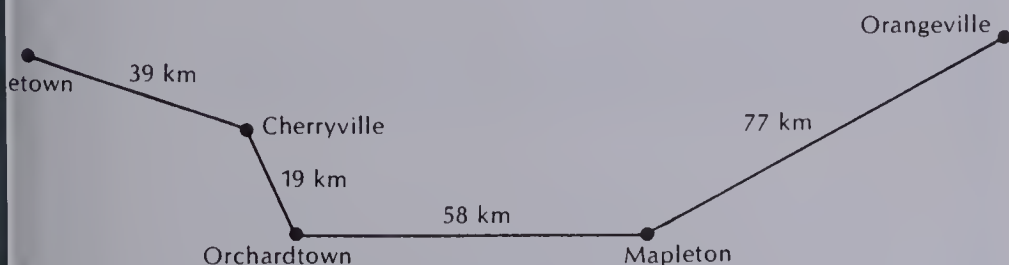
## REVIEW

Add					
1. 15 + 24 39	2. 28 + 60 88	3. 62 + 7 69	4. 30 + 50 80	5. 70 + 9 79	
6. 15 + 6 21	7. 28 + 5 33	8. 62 + 9 71	9. 32 + 8 40	10. 79 + 9 88	
11. 15 + 39 54	12. 28 + 26 54	13. 62 + 24 86	14. 32 + 49 81	15. 79 + 17 96	

69

## Practice

How many kilometres?



- Appletown to Orchardtown 58 km 2. Mapleton to Cherryville 77 km  
 Orangeville to Orchardtown 135 km 4. Appletown to Mapleton 116 km  
 Cherryville to Orangeville 154 km 6. Orangeville to Appletown 193 km

Complete the equations.

- 1 km = 1000 m 8. 9 km = 9000 m 9. 5 km = 5000 m

## Assigning the Practice

Minimum: A-W

Average: A-W

Enriched: A-W

## Review Exercises

Questions	Objective	Pages
1-5	A10	62-63
6-10	A11	64-65
11-15	A12	66-67

## Reinforcement

1. Devise a worksheet on the kilometre which uses the local map you have designed for the lesson.

2. Devise a sorting activity with the categories centimetre, metre, and kilometre. Provide pictures and vocabulary on cards for classification by appropriate unit of measure.

## Enrichment

1. Help prepare a bar graph comparing the means by which your students get to school. Challenge the students to compose word problems from the graph.

2. Hold a bicycle rodeo with such events as:

*The Coasting Race* Pedal for 5 m. Then coast as far as possible. Measure the result.

*The Slowpoke Race* On a narrow, well-defined course of 50 m, take as long as possible to finish without putting a foot down or straying from the path.

*The Target Race* Place small cans on a course at 1 m intervals for 20 m. Try to drop a pebble or piece of clay into each in turn.

3. Establish a kilometre running course and form a 100 km fitness club.

4. The game *Vancouver Buses* is available from the Ministry of Education in British Columbia.

Objective A13

Add two 2-digit addends, regrouping tens.

Introducing the Lesson

Recall that 10 ones = 1 ten and 10 tens = 1 hundred. Write the following examples on the chalkboard and then use number blocks to complete them.

- 13 tens =  
\_\_\_ hundreds \_\_\_ tens \_\_\_ ones = \_\_\_
  - 24 tens =  
\_\_\_ hundreds \_\_\_ tens \_\_\_ ones = \_\_\_
  - 18 tens 3 ones =  
\_\_\_ hundreds \_\_\_ tens \_\_\_ ones = \_\_\_
  - 27 tens 6 ones =  
\_\_\_ hundreds \_\_\_ tens \_\_\_ ones = \_\_\_
- Explain the following problems with and without number blocks.

5 tens

+7 tens

60

+70

8 tens

+8 tens

90

+50

Teaching the Lesson

Explain what an **odometer** is and how it works. Discuss the problem concerning Walt's odometer on page 70. Using an addition grid and number blocks, model the problem explaining each step carefully.

Devise other similar problems. "Walt's odometer shows 62 km. After he drives 75 km, what will his odometer show?" After a couple of problems have been done with an addition grid and number blocks, have the students come to the chalkboard and work several without materials.

81

+86

94

+54

67

+82

40

+79

Have the students also write numerals in *standard form* from word forms that necessitate trading in the tens place.

- 5 tens and 95 ones
- 25 tens 7 ones
- 54 ones
- 16 tens

Three-Digit Sums

Walt's car odometer shows 53 km.  
After he drives 72 km more,  
what will his odometer show?



Add the ones.

Add the tens.

Place value trade.  
10 tens for 1 hundred.

53

+ 72

53

+ 72

5

53

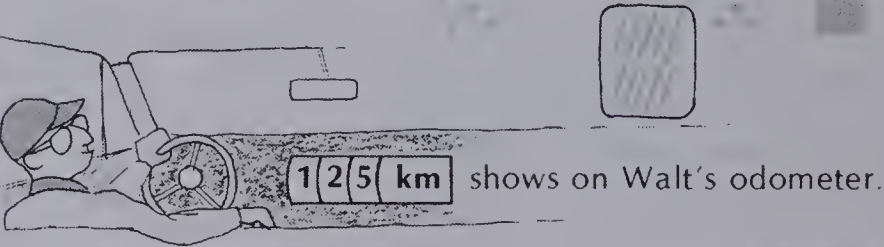
+ 72

12 5

53

+ 72

125



EXERCISES

Add.

1. 73

2. 93

3. 44

4. 80

+ 72

+ 63

+ 81

+ 86

145

156

125

166

5. 70

6. 23

7. 95

8. 31

+ 85

+ 42

+ 91

+ 34

155

65

186

65

9. 61 and 62

10. 55 and 61

11. 35 and 20

12. 83 and 73

13. 86 and 82

14. 90 and 16

15. 38 and 71

16. 45 and 84

123

116

55

156

168

106

109

129

Using the Exercises

- Questions 1 to 8 are vertical addition problems requiring trading in the tens place.
- Questions 9 to 16 are horizontal problems which must first be written in the proper vertical form before adding.



## PRACTICE

Add.

A.  $\begin{array}{r} 84 \\ + 74 \\ \hline 158 \end{array}$  B.  $\begin{array}{r} 73 \\ + 53 \\ \hline 126 \end{array}$  C.  $\begin{array}{r} 67 \\ + 82 \\ \hline 149 \end{array}$  D.  $\begin{array}{r} 42 \\ + 52 \\ \hline 94 \end{array}$  E.  $\begin{array}{r} 83 \\ + 95 \\ \hline 178 \end{array}$

F.  $\begin{array}{r} 72 \\ + 72 \\ \hline 144 \end{array}$  G.  $\begin{array}{r} 62 \\ + 37 \\ \hline 99 \end{array}$  H.  $\begin{array}{r} 53 \\ + 55 \\ \hline 108 \end{array}$  I.  $\begin{array}{r} 78 \\ + 91 \\ \hline 169 \end{array}$  J.  $\begin{array}{r} 74 \\ + 35 \\ \hline 109 \end{array}$

K.  $\begin{array}{|c|c|c|} \hline 0 & 7 & 8 \\ \hline \end{array}$  km plus 90 km  $168$  km L.  $\begin{array}{|c|c|c|} \hline 0 & 9 & 6 \\ \hline \end{array}$  km plus 93 km  $189$  km  
M.  $\begin{array}{|c|c|c|} \hline 0 & 4 & 3 \\ \hline \end{array}$  km plus 73 km  $116$  km N.  $\begin{array}{|c|c|c|} \hline 0 & 6 & 8 \\ \hline \end{array}$  km plus 30 km  $98$  km  
O.  $\begin{array}{|c|c|c|} \hline 0 & 3 & 5 \\ \hline \end{array}$  km plus 84 km  $119$  km P.  $\begin{array}{|c|c|c|} \hline 0 & 5 & 3 \\ \hline \end{array}$  km plus 74 km  $127$  km

74 jeeps  
63 trucks

52 ferries  
94 tugboats

55 helicopters  
33 jets

Q. How many in the water?  $146$  R. How many in the air?  $88$   
S. How many start with j?  $107$  T. How many start with t?  $157$

Write in standard form.

U. 13 tens 6 ones  $136$  V. 26 tens 3 ones  $263$  W. 4 tens 53 ones  $93$   
X. 3 tens 85 ones  $115$  Y. 6 tens 58 ones  $118$  Z. 4 tens 66 ones  $106$

## Walt Hates ODD Odometers.

$\begin{array}{|c|c|c|} \hline 0 & 7 & \phantom{00} \\ \hline \end{array}$

$\begin{array}{|c|c|c|} \hline 0 & 9 & 5 \\ \hline \end{array}$   
standard form



1.  $\begin{array}{|c|c|c|} \hline 0 & 6 & \phantom{00} \\ \hline \end{array}$   $97$  2.  $\begin{array}{|c|c|c|} \hline 1 & \phantom{00} & 3 \\ \hline \end{array}$   $523$  3.  $\begin{array}{|c|c|c|} \hline 1 & \phantom{00} & 5 \\ \hline \end{array}$   $835$   
4.  $\begin{array}{|c|c|c|} \hline 1 & 7 & \phantom{00} \\ \hline \end{array}$   $185$  5.  $\begin{array}{|c|c|c|} \hline 5 & \phantom{00} & 9 \\ \hline \end{array}$   $739$  6.  $\begin{array}{|c|c|c|} \hline 4 & 2 & \phantom{00} \\ \hline \end{array}$   $473$   
7.  $\begin{array}{|c|c|c|} \hline 2 & 7 & \phantom{00} \\ \hline \end{array}$   $311$  8.  $\begin{array}{|c|c|c|} \hline 4 & 3 & \phantom{00} \\ \hline \end{array}$   $483$  9.  $\begin{array}{|c|c|c|} \hline 3 & 7 & \phantom{00} \\ \hline \end{array}$   $401$

71

## Assigning the Practice

Minimum: A-P

Average: A-T

Enriched: A-Z

## Reinforcement

1. Assign Walt Hates Odd Odometers, page 71.

2. Using pennies, dimes, and dollars, discuss and work several two-digit addition problems requiring trading in the tens place.

13 dimes =

— dollars — dimes — pennies = \$—.

9 dimes 16 pennies =

— dollars — dimes — pennies = \$—.

70¢	90¢	\$1	10¢	1¢
+60¢	+16¢		9	27

3. Prepare addition tables similar to those shown below as task cards.

+	76	95	84	53
21				
43				
62				

+	8 tens	5 tens	9 tens	7 tens
96 ones				
84 ones				
79 ones				

## Enrichment

1. Ask the following riddle. Children determine the answer from the letters in the Practice section.

How does Walt measure perfume?  
Decode the answer:  
93-169-157-108 158-98  
119-94-119-88-116-178-157-178-88  
Answer:  
With an Odor-meter

2. Borrow a bicycle with an odometer. Discuss how the odometer works. Demonstrate that a kilometre is composed of 10 equal lengths, each of 100 m.

## Practice

## Worksheet A13

Pages 70-71

25 + 92 =  $117$  2. 75 + 93 =  $168$  3. 64 + 82 =  $146$   
75 + 74 =  $149$  5. 83 + 76 =  $159$  6. 32 + 81 =  $113$

by adding

How many by land?  $87$

How many by water?  $154$

How many start with s?  $197$

How many start with b?  $129$

How many with 6 letters?  $128$

44 bicycles  
62 submarines  
85 blimps  
43 skates  
92 ships

## Objective A14

Add two 2-digit addends with regrouping.

## Introducing the Lesson

Review the relationship of ones, tens, and hundreds.

10 ones = 1 ten

10 tens = 1 hundred

42 ones = 4 tens and 2 ones

42 tens = 4 hundreds and 2 tens

## Teaching the Lesson

Using a map of Alberta, begin a discussion of Walt's air flight, shown on page 72, from *Edmonton* to *High River*. Find on the map the cities he flies over along the way.

With an addition grid and number blocks (or dollars, dimes, and pennies), build a model of the problem given at the top of page 72.

37 km Edmonton to Leduc

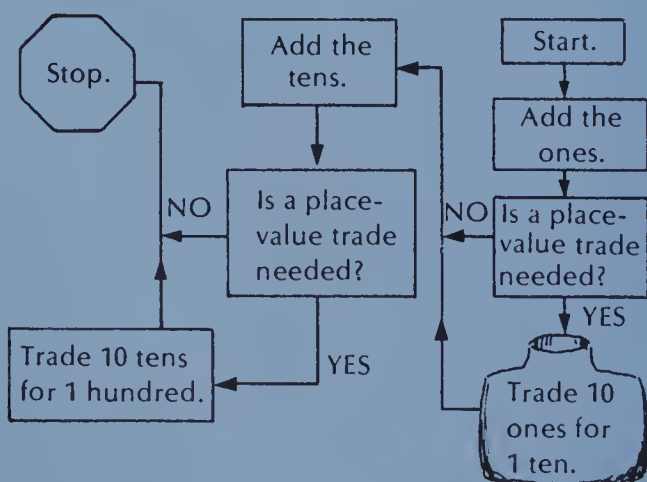
+66 km Leduc to Ponoka

— km in all


Point out that two place-value trades are required: 10 ones for 1 ten and 10 tens for 1 hundred.

Using place-value materials, model the problem  $74 + 98$ . Have the students suggest the necessary steps involved. Record the process as a flow chart.

## Addition Flow Chart



# Three-Digit Sums

Walt flies from Edmonton to Ponoka.  
How many kilometres does he fly?

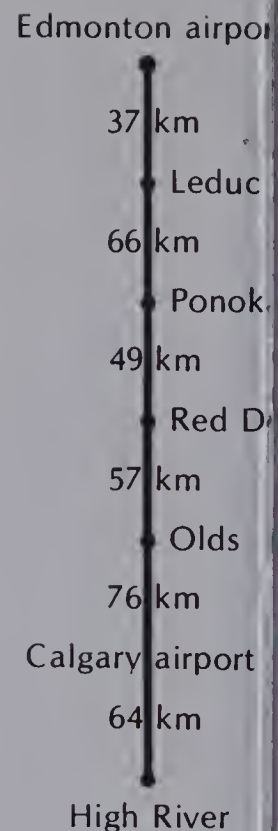
Add the ones.  
Place value trade.  
10 ones for 1 ten.

$$\begin{array}{r} 1 \\ 37 \text{ km} \\ + 66 \text{ km} \\ \hline 3 \end{array}$$

Add the tens.  
Place value trade.  
10 tens for 1 hundred.

$$\begin{array}{r} 1 \\ 37 \text{ km} \\ + 66 \text{ km} \\ \hline 103 \text{ km} \end{array}$$

Walt flies 103 km.



## EXERCISES

Add.

1. $\begin{array}{r} 57 \\ + 66 \\ \hline 123 \end{array}$	2. $\begin{array}{r} 86 \\ + 67 \\ \hline 153 \end{array}$	3. $\begin{array}{r} 72 \\ + 81 \\ \hline 153 \end{array}$	4. $\begin{array}{r} 77 \\ + 37 \\ \hline 114 \end{array}$	5. $\begin{array}{r} 22 \\ + 92 \\ \hline 114 \end{array}$
6. $\begin{array}{r} 86 \\ + 96 \\ \hline 182 \end{array}$	7. $\begin{array}{r} 81 \\ + 91 \\ \hline 172 \end{array}$	8. $\begin{array}{r} 85 \\ + 55 \\ \hline 140 \end{array}$	9. $\begin{array}{r} 25 \\ + 15 \\ \hline 40 \end{array}$	10. $\begin{array}{r} 88 \\ + 88 \\ \hline 176 \end{array}$

How far?

11. Leduc to Red Deer  $115 \text{ km}$  12. Ponoka to Olds  $106 \text{ km}$   
13. Red Deer to Calgary  $133 \text{ km}$  14. Olds to High River  $140 \text{ km}$

## Using the Exercises

- Questions 1 to 10 give practice adding 2-digit numerals and trading twice.
- Questions 11 to 14 require looking at the map for the distances and then adding.



## PRACTICE

Add.				
A. 68 + 63 <u>131</u>	B. 56 + 74 <u>130</u>	C. 38 + 24 <u>62</u>	D. 77 + 97 <u>174</u>	E. 84 + 75 <u>159</u>
F. 57 + 42 <u>99</u>	G. 59 + 58 <u>117</u>	H. 77 + 76 <u>153</u>	I. 38 + 38 <u>76</u>	J. 33 + 67 <u>100</u>
K. 82 + 62 <u>144</u>	L. 79 + 26 <u>105</u>	M. 34 + 44 <u>78</u>	N. 82 + 89 <u>171</u>	O. 97 + 28 <u>125</u>
P. 43 + 75 <u>118</u>	Q. 47 + 55 <u>102</u>	R. 98 + 36 <u>134</u>	S. 46 + 67 <u>113</u>	T. 95 + 98 <u>193</u>

How many kilometres in all?

- U. Walk 53 km to Red Deer.  
Then fly to Olds. 110 km
- V. Run 68 km to High River.  
Then fly to Calgary. 132 km
- W. Bike 72 km to Leduc.  
Then fly to Edmonton. 109 km
- X. Drive 99 km to Calgary.  
Then fly to Olds. 175 km
- Y. Skate 24 km to Ponoka.  
Then fly to Leduc. 90 km
- Z. Jog 98 km to Olds.  
Then fly to Red Deer. 155 km

## Addition Code

Why does Walt have

12 14 23 26 14 22 20 25 19 20 30 21 16 31 ?  
A C L O C K I N H I S J E T ?  
19 16 23 20 22 16 30 31 26 30 16 16 31 20 24 16 17 23 36.  
H E L I K E S T O S E E T I M E F L Y.  
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z  
90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115

Hint! Add 78  
and look below.



73

## Assigning the Practice

Minimum: A-T

Average: A-Z

Enriched: A-Z

## Reinforcement

1. Assign Addition Code.

2. On a worksheet devise cross-sum puzzles similar to this one.

Across	Down
1. 62 + 79	1. 93 + 8
3. 85 + 25	2. 75 + 65

1		2
3		

3. Play the game called "The Biggest Sum". A deck of 20 number cards (two sets of 0 to 9) are placed face down. In turn, each player draws a card and plays it on his or her addition board. The largest 2-digit sum wins.

Addition Board Cards on the Board

□	□
+	□
<u>    </u>	

3	6
+	9
<u>15</u>	

## Enrichment

1. Study the flow chart made in this lesson and have the pupils discover how it can be extended to the thousands place. Then use it to do larger sums.

2. Many Grade 3 students are fascinated by aircraft of the past and present. Check your library for illustrated books and filmstrips featuring airplanes.

3. Have a paper airplane contest with four separate categories: distance, duration, acrobatics, styling.

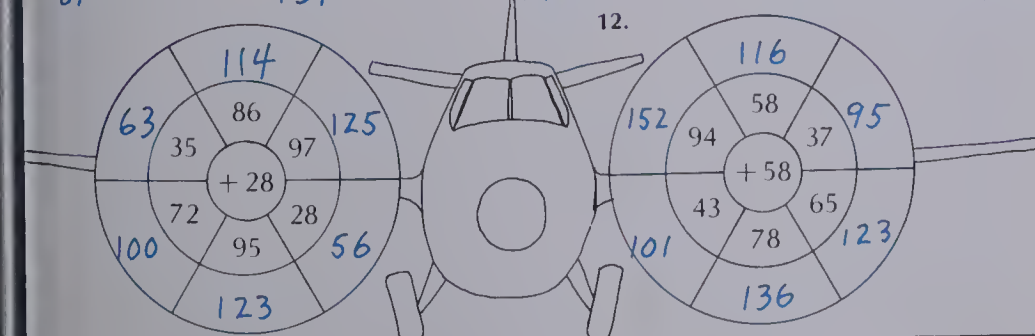
4. Have the students use their dictionaries to learn these aircraft terms: rudder, fuselage, cockpit, aileron, flap, horizontal and vertical stabilizers.

## Extra Practice

## Worksheet A14

Pages 72-73

35 + 48 <u>83</u>	2. 76 + 67 <u>143</u>	3. 24 + 36 <u>60</u>	4. 52 + 57 <u>109</u>	5. 92 + 29 <u>121</u>
33 + 48 <u>81</u>	7. 44 + 95 <u>139</u>	8. 99 + 99 <u>198</u>	9. 88 + 88 <u>176</u>	10. 77 + 77 <u>154</u>



# UNIT 4 LESSON 7

## Objective A15

Add four one-digit addends with sums to 29.

## Introducing the Lesson

Review the work with sums to 18 involving 3 addends. Explain that these problems can be worked in 3 different ways.

$$\begin{array}{r} 6+3+4 \\ 9+4 \end{array} \quad \begin{array}{r} 6+3+4 \\ 7+6 \end{array} \quad \begin{array}{r} 6+3+4 \\ 10+3 \end{array}$$

Stress looking for 10s as you assist the students in working a few examples.

Investigate the patterns that occur in the following sequences of problems.

$$\begin{array}{r} 5 \\ +4 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ +4 \\ \hline \end{array} \quad \begin{array}{r} 25 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +7 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ +7 \\ \hline \end{array} \quad \begin{array}{r} 26 \\ +7 \\ \hline \end{array}$$

## Teaching the Lesson

Draw a map of the Toronto subway, shown on page 74, on the chalkboard. Discuss Walt's trip from Finch to St. George. Show how adding these distances can be done starting at the top or from the bottom.

$$\begin{array}{r} 4 \text{ } 13 \\ 9 \text{ } 9 \\ 3 \text{ } 3 \\ +4 \text{ } +4 \\ \hline \hline \end{array} \quad \begin{array}{r} 4 \text{ } 16 \\ 9 \text{ } 9 \\ 3 \text{ } 3 \\ +4 \text{ } +4 \\ \hline \hline \end{array} \quad \begin{array}{r} 4 \text{ } 7 \\ 9 \text{ } 9 \\ 3 \text{ } 3 \\ +4 \text{ } +4 \\ \hline \hline \end{array} \quad \begin{array}{r} 4 \text{ } 16 \\ 9 \text{ } 9 \\ 3 \text{ } 3 \\ +4 \text{ } +4 \\ \hline \hline \end{array}$$

Point out that sometimes we can look for 10s as we begin to add.

$$\begin{array}{r} 1 \text{ } 9 \\ 8 \text{ } 3 \\ 8 \text{ } 7 \\ +2 \text{ } +8 \\ \hline \hline \end{array} \quad \begin{array}{r} 6 \text{ } 10 \\ 4 \text{ } 4 \\ 3 \text{ } 3 \\ +2 \text{ } +2 \\ \hline \hline \end{array} \quad \begin{array}{r} 8 \text{ } 10 \\ 7 \text{ } 3 \\ 10 \text{ } 7 \\ +2 \text{ } +2 \\ \hline \hline \end{array}$$

Try several problems, discussing the order of work for each.

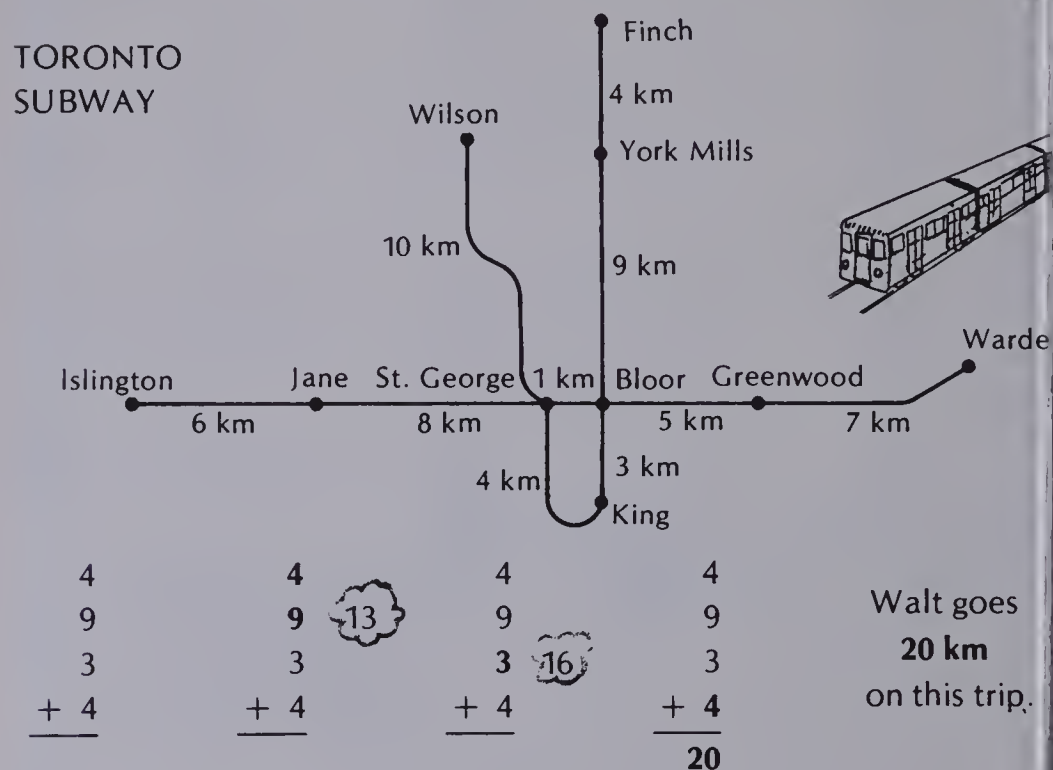
$$\begin{array}{r} 7 \text{ } 5 \text{ } 3 \text{ } 60 \text{ } 40 \\ 1 \text{ } 2 \text{ } 5 \text{ } 10 \text{ } 60 \\ 8 \text{ } 3 \text{ } 9 \text{ } 60 \text{ } 70 \\ +7 \text{ } +5 \text{ } +3 \text{ } +90 \text{ } +30 \\ \hline \hline \hline \hline \hline \end{array}$$

$$4 + 8 + 2 + 6 = \blacksquare \quad 20 + 10 + 80 + 90 = \blacksquare$$

# Four Addends

Walt takes this subway path. How many kilometres does he go?

Finch → York Mills → Bloor → King → St. George



# EXERCISES

Add.

1.	6	16	2.	6	16	3.	7	17	4.	9	
	+ 2	+ 2		+ 6	+ 6		+ 3	+ 3		+ 2	+
	<u>8</u>	<u>18</u>		<u>12</u>	<u>22</u>		<u>10</u>	<u>20</u>		<u>11</u>	<u>21</u>
5.	4		6.	4		7.	4		8.	4	
	3			9			9			9	
	9			3			4			6	
	+ 2			+ 6			+ 3			+ 8	
	<u>18</u>			<u>22</u>			<u>20</u>			<u>27</u>	

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## Using the Exercises

- Questions 1 to 4 give practice with the intermediary steps required for questions 5 to 8.
- Questions 5 to 8 deal with sums involving 4 addends.



## PRACTICE

Add.

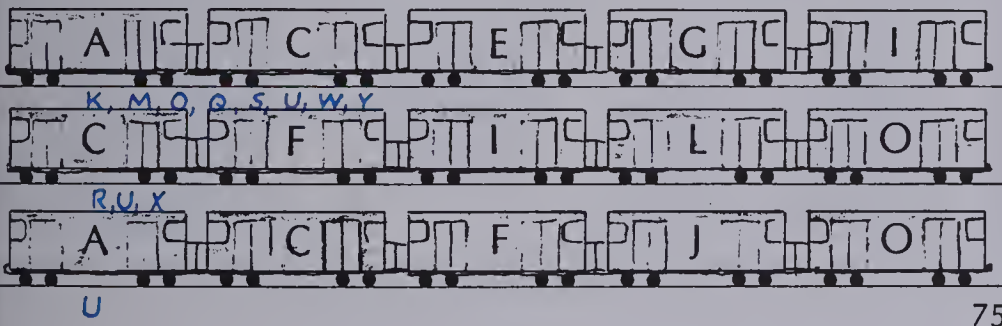
A. 3 3 6 + 8 <u>20</u>	B. 7 7 3 + 9 <u>26</u>	C. 8 8 6 + 5 <u>27</u>	D. 7 7 7 + 7 <u>28</u>	E. 6 3 9 + 1 <u>19</u>
F. 6 6 5 + 6 <u>23</u>	G. 3 2 3 + 4 <u>12</u>	H. 5 5 5 + 6 <u>21</u>	I. 9 9 1 + 9 <u>28</u>	J. 3 9 9 + 7 <u>28</u>
K. 70 30 40 + 60 <u>200</u>	L. 30 80 70 + 30 <u>210</u>	M. 80 40 30 + 90 <u>240</u>	N. 50 30 60 + 80 <u>220</u>	O. 90 90 60 + 30 <u>270</u>

How many kilometres in all?

- P. 3 km, 6 km, 1 km, 2 km 12 km Q. 9 km, 4 km, 7 km, 9 km 29 km  
 R. 7 km, 4 km, 8 km, 5 km 24 km S. 5 km, 7 km, 5 km, 4 km 21 km  
 T. Warden → Greenwood → Bloor → York Mills → Finch 25 km  
 U. King → Bloor → St. George → Jane → Islington 18 km

## Subway Sequences

Keep the patterns going. For top speed use an alphabet.



75

## Extra Practice

## Worksheet A15

Pages 74-75

d.

16 + 5 <u>21</u>	2. 22 + 3 <u>25</u>	3. 18 + 4 <u>22</u>	4. 23 + 5 <u>28</u>	5. 15 + 7 <u>22</u>
7 2 7 + 5 <u>21</u>	7. 8 8 6 + 2 <u>24</u>	8. 9 5 4 + 6 <u>24</u>	9. 6 6 3 + 7 <u>22</u>	10. 5 7 9 + 5 <u>26</u>

$$4 + 4 + 5 + 5 = 18$$

$$12. 6 + 6 + 7 + 7 = 26$$

$$9 + 1 + 2 + 8 = 20$$

$$14. 3 + 6 + 5 + 9 = 23$$

## Assigning the Practice

Minimum: A-U

Average: A-U

Enriched: A-U

## Reinforcement

- Have the students search a 10 by 10 number grid for sums of 20. Score 1 point for 2 adjoining addends, 3 points for 3 adjoining addends, and 10 points for 4 addends. To prepare the number grid, first include many suitable combinations. Then fill in any extra spaces with numbers from 0 to 10.

5	5	8	3	2
2	6	4	9	5
9	4	1	11	5
1	6	6	3	10

- Prepare mazes or dot-to-dots that require counting by numbers less than 10.

## Enrichment

- Ask the following question and have the students decode the answer using the answers and letters from the Practice section.

Where is another Canadian subway located?

Decode the answer.

240-270-220-25-24-19-20-210

29-18-19-26-19-27

Answer: Montreal, Quebec

- Assign *Subway Sequences*, page 75. Challenge the students to devise their own sequences.

- Investigate the sets of 4 addends which have a sum of 20. Challenge the students to find at least 30 different sets.

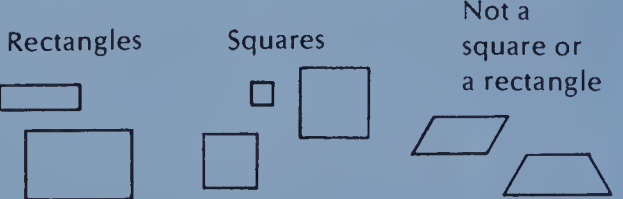
- Cover a large table with butcher paper. Allow the students to design and construct a city and countryside that include as many types of transportation as possible using paint, small boxes, and Plasticene. Integrate measurement concepts and help the students develop a notion of comparable size (scale).

Objective M7

Find the perimeters of rectangles and squares by adding.

Introducing the Lesson

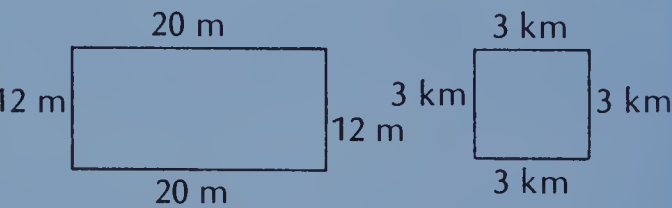
Display some cardboard rectangles and squares. Have students try to determine and state the defining properties of squares and rectangles. Classify several kinds of cardboard figures on a sorting board as shown below. Include quadrilaterals such as parallelograms and trapezoids.



Teaching the Lesson

Ask the students to recall that the perimeter of a triangle (Unit 1, Lesson 7) is the distance around its edge or rim (perimeter). Point out that we find the perimeter of a triangle by adding the lengths of its three sides.

Relate finding the perimeter of a rectangle to putting fencing around someone's property. Draw several possible rectangular lots or yards on the chalkboard, labelling the sides.



Discuss why it is that for a square only one side needs to be labelled (all sides are equal) and that for a rectangle only two sides need to be labelled (opposite sides are equal). Have the students add 4 numbers to find the amount of fencing required to go around the perimeters of these lots.

Draw squares with only one side labelled and rectangles with two sides labelled. The pupils find the perimeter.

Distribute cardboard squares and rectangles for the students to measure and calculate the perimeters.

Perimeter of a Rectangle

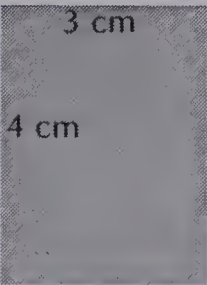
A rectangle has 4 sides.

The opposite sides have equal length.

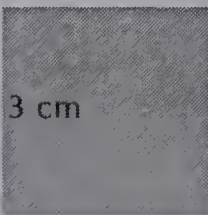
A square is a kind of rectangle.

All four sides have equal length.

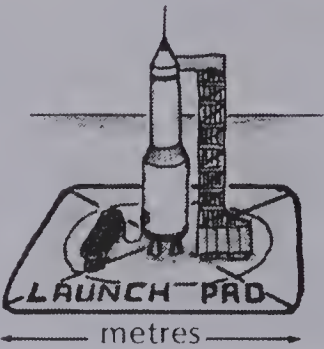
We find the perimeter of a rectangle by adding 4 lengths.



$$\begin{array}{r} 3 \text{ cm} \\ 3 \text{ cm} \\ 4 \text{ cm} \\ + 4 \text{ cm} \\ \hline 14 \text{ cm} \end{array}$$

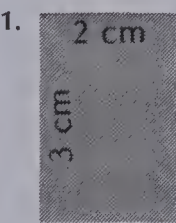


$$\begin{array}{r} 3 \text{ cm} \\ 3 \text{ cm} \\ 3 \text{ cm} \\ + 3 \text{ cm} \\ \hline 12 \text{ cm} \end{array}$$

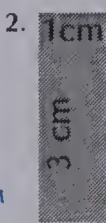


EXERCISES

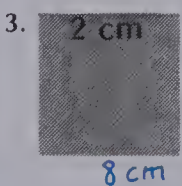
Find the perimeter.



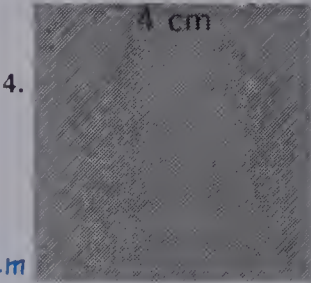
10 cm



8 cm



8 cm



16 cm

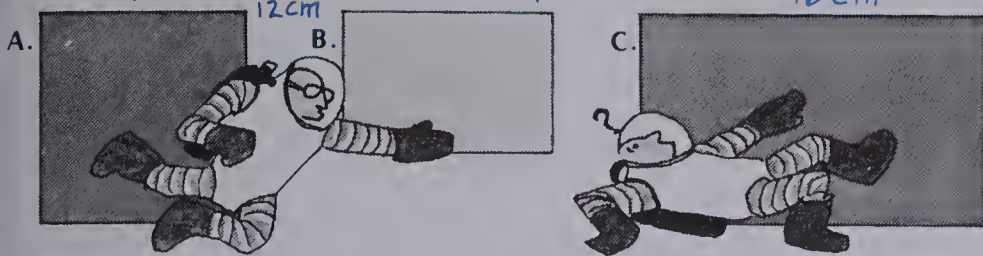
Using the Exercises

- Questions 1 and 2 require the student to find the perimeters of rectangles that are already measured.
- Questions 3 and 4 ask for the perimeters of squares that are already measured.



## PRACTICE

Find the perimeter.



- D. Square: 5 km wide 20 km E. Rectangle: 5 m wide, 3 m long 16 m  
 F. Square: 6 m wide 24 km G. Rectangle: 6 km wide, 5 km long 22 km  
 H. Square: 70 cm wide 280 cm I. Rectangle: 90 m wide, 30 m long 240 m

Kilometres, metres, or centimetres for the perimeter?

- J. a desk cm K. the classroom m L. a large lake km  
 M. the school m N. a window cm O. drawing paper cm  
 P. the gym floor m Q. a city km R. a chalk eraser cm

## REVIEW

A13	Add.				
	1. 76	2. 45	3. 52	4. 16	5. 85
	$\begin{array}{r} 76 \\ + 80 \\ \hline 156 \end{array}$	$\begin{array}{r} 45 \\ + 83 \\ \hline 128 \end{array}$	$\begin{array}{r} 52 \\ + 77 \\ \hline 129 \end{array}$	$\begin{array}{r} 16 \\ + 90 \\ \hline 106 \end{array}$	$\begin{array}{r} 85 \\ + 93 \\ \hline 178 \end{array}$
A14	6. 76	7. 45	8. 52	9. 16	10. 75
	$\begin{array}{r} 76 \\ + 45 \\ \hline 121 \end{array}$	$\begin{array}{r} 45 \\ + 95 \\ \hline 140 \end{array}$	$\begin{array}{r} 52 \\ + 89 \\ \hline 141 \end{array}$	$\begin{array}{r} 16 \\ + 88 \\ \hline 104 \end{array}$	$\begin{array}{r} 75 \\ + 57 \\ \hline 132 \end{array}$
A15	11. 3	12. 7	13. 9	14. 30	15. 60
	$\begin{array}{r} 3 \\ + 4 \\ \hline 7 \end{array}$	$\begin{array}{r} 7 \\ + 8 \\ \hline 15 \end{array}$	$\begin{array}{r} 9 \\ + 7 \\ \hline 16 \end{array}$	$\begin{array}{r} 30 \\ + 50 \\ \hline 80 \end{array}$	$\begin{array}{r} 60 \\ + 70 \\ \hline 130 \end{array}$

77

## Assigning the Practice

Minimum: A-R

Average: A-R

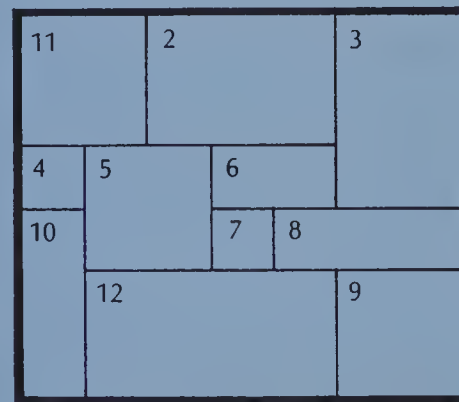
Enriched: A-R

## Review Exercises

Questions	Objective	Pages
1-5	A13	70-71
6-10	A14	72-73
11-15	A15	74-75

## Reinforcement

1. Divide the students into groups of four. Give each group a centimetre ruler, a pair of dice, and perimeter board (as shown below). In turn, each player tosses the dice, then measures and finds the perimeter of the rectangle numbered the same as the toss. If correct, the player adds this perimeter to his or her score. The first player to reach 180 wins.



2. Prepare problem-solving work cards involving perimeters.

Make a square with a perimeter of 16 cm.

Make a rectangle with a perimeter of 24 cm.

Let the students use strings and a centimetre ruler.

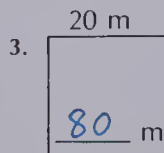
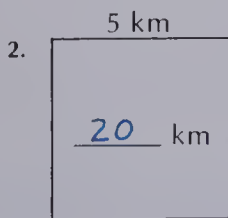
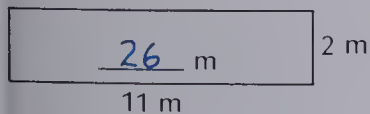
## Enrichment

1. Give the length and width measurements for about 10 shapes. Ask the students to draw or to construct these shapes.

2. Supply an assortment of rectangular cards. Challenge someone to tile (cover without overlapping) a large rectangle, square, or suitable figure with the cards.

## Extra Practice

Find the perimeters.



- a square 4 m wide: 16 m 5. a square 20 km wide: 80 km  
 a square 40 cm wide: 160 m 7. a square 8 m wide: 32 m  
 a rectangle 3 m wide and 9 m long: 24 km  
 a rectangle 70 cm wide and 40 cm long: 220 cm  
 a rectangle 20 m wide and 90 m long: 220 m

## Worksheet M7

Pages 76-77

Unit 4 Objective	Test Questions	Pages
A10	4, 5, 8, 17	62-63
A11	1-3, 10	64-65
A12	6, 7, 9	66-67
M6	11-13	68-69
A13	14-16	70-71
A14	18-23	72-73
A15	24-28	74-75
M7	29-31	76-77

# TEST

# UNIT 4

Add.

1.

14

+

8

22

2.

29

+

9

38

3.

78

+

2

80

4.

57

+

2

59

5.

38

+

20

58

6.

34

+

17

51

7.

19

+

78

97

8.

43

+

44

87

9.

35

+

35

70

10.

9

+

48

57

Copy and complete.

11.

5 km =

5000

m

12.

6 km =

6000 m

13.

2 km =

2 km

Add.

14.

62

+

64

126

15.

80

+

37

117

16.

84

+

84

168

17.

52

+

47

99

18.

98

+

19

117

19.

58

+

58

116

20.

94

+

57

151

21.

99

+

6

105

22.

25

+

75

100

23.

32

+

88

120

24.

5

+

3

17

25.

6

+

6

24

26.

9

+

7

27

27.

10

+

80

140

28.

90

+

90

270

Measure and add to find each perimeter.

29.

30.

31.

## Post-test

## Un 4

Add.

1.

13

+

9

22

2.

19

+

4

23

3.

64

+

6

70

4.

72

+

7

79

5.

5

+

4

9

6.

43

+

18

61

7.

21

+

39

60

8.

23

+

76

99

9.

25

+

68

93

10.

7

+

5

12

Copy and complete.

11.

8 km =

8000 m

12.

3 km =

3000 m

13.

9 km =

90 m

14.

72

+

74

146

15.

79

+

40

119

16.

95

+

74

169

17.

25

+

74

99

18.

84

+

67

151

19.

67

+

67

134

20.

26

+

95

121

21.

98

+

7

105

22.

85

+

15

100

23.

92

+




78

170



## NUMERALS TO 9999

Show the numerals in standard form.

1.  214
2.  123
3.  240
4. from 83 to 95
5. from 491 to 503
6. from 804 to 816
7.  $300 + 20 + 4$  324
8.  $600 + 10 + 9$  619
9.  $2 + 300 + 50$  352
10.  $80 + 3 + 200$  283
11.  $700 + 20$  720
12.  $600 + 5$  605
13. Count from 432 to 542 by tens.
14. Count from 93 to 993 by hundreds.

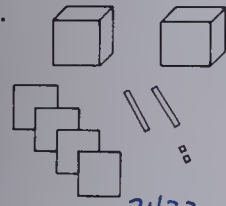
Copy and complete the equations.

15.  $2 \text{ dm} = \text{■} \text{ cm}$  20
16.  $2 \text{ dm} + 3 \text{ cm} = \text{■} \text{ cm}$  23
17.  $\text{■} \text{ dm} + \text{■} \text{ cm} = 32 \text{ cm}$  3 2
18.  $3 \text{ m} = \text{■} \text{ cm}$  300
19.  $4 \text{ m} + 6 \text{ dm} + 2 \text{ cm} = \text{■} \text{ cm}$  462
20.  $6 \text{ m} + 8 \text{ dm} = \text{■} \text{ cm}$  680

Use < or >

21.  $45 \text{ ■ } 98$  <
22.  $432 \text{ ■ } 450$  <
23.  $747 \text{ ■ } 699$  >
24.  $934 \text{ ■ } 932$  >
25.  $256 \text{ ■ } 329$  <
26.  $245 \text{ ■ } 98$  >

Show the numerals in standard form.

27.  2422
28. three thousand six hundred two 3602
29. one thousand seventy-six 1076
30. from 2678 to 2695
31. from 3490 to 3510

79

## Informal Assessment

1. The student demonstrates 2-digit addition with regrouping using place-value materials.

$$\begin{array}{r} 34 \\ +28 \\ \hline \end{array} \quad \begin{array}{r} 63 \\ +91 \\ \hline \end{array} \quad \begin{array}{r} 55 \\ +65 \\ \hline \end{array} \quad \begin{array}{r} 94 \\ +37 \\ \hline \end{array}$$

2. The student is able to perform four-addend addition to 29 on a number line.

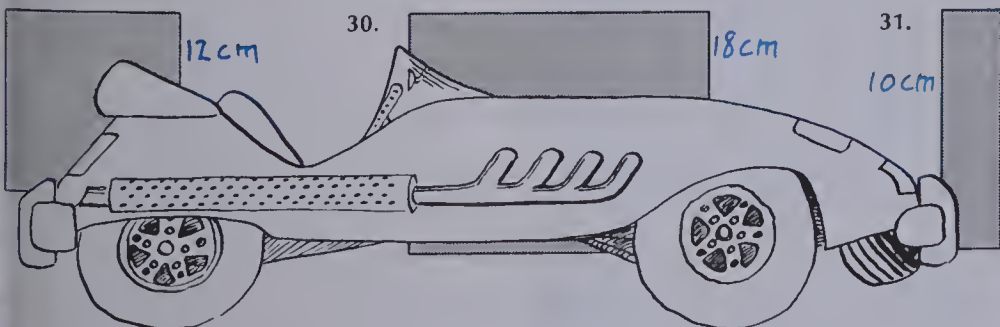
$$3 + 6 + 7 + 9$$

$$3 + 2 + 8 + 2$$

3. The student can use a centimetre ruler to measure the perimeter of squares and other rectangles.

5	25.	7	26.	4	27.	60	28.	30
4		7		8		10		40
6		7		9		40		70
+4		+7		+3		+80		+80
<u>19</u>		<u>28</u>		<u>24</u>		<u>190</u>		<u>220</u>

asure and add to find each perimeter.



# UNIT 5

## Subtraction

Theme: Winter

Lesson		Objective	Vocabulary	Materials
Preview		Recall subtraction facts to 20.	take away 10, take away from 10, bridging with 10	subtraction flash cards
1	A16	Subtract two-digit numerals without regrouping.	horizontal, vertical	number blocks
2	A17	Subtract one-digit numerals from two-digit numerals with regrouping.	trade a ten	number blocks
3	A18	Subtract two-digit numerals with regrouping.	compare ones, horizontal, vertical	number blocks
4	G1	Identify and construct common-plane, closed figures.	plane, circle, square, triangle, rectangle, curved, straight	plane figure flash cards, cardboard squares, triangles, rectangles, and circles
5	A19	Subtract two-digit numerals from three-digit numerals with two-digit differences.		number blocks
6	A20	Find the difference between two numerals requiring regrouping from zero in the minuend.	difference, differ	metre stick, yarn
7	A21	Check addition and subtraction problems by the inverse operation.	opposites, do, undo, check	cardboard shapes
8	PS7	Identify key phrases found in addition and subtraction word problems.	in all, total, sum, fewer, difference	
	PS8	Organize information from a paragraph for addition and subtraction problems.	summarize	overhead projector, transparency
Test		Subtraction		
Review		Addition		



# About This Unit

Upon completing Unit 5, Subtraction, the student should approach two-digit subtraction work with practised skill and a concrete understanding of computational concepts and procedures with the decisions involved. The only prerequisite for this unit is conceptual success with Unit 3, Numeration, and Unit 4, Addition. It is not necessary for the student to have mastered the subtraction facts (or addition facts) before beginning Unit 5; in fact, Unit 5 will naturally assist with a basic facts development program. An approach incorporating concrete materials and a Fact Master should enable all students to enjoy success with the fundamental ideas and activities covered in Unit 5.

Subtraction with regrouping is traditionally considered one of the more difficult topics of Grade 3 mathematics. To make the experience enjoyable and successful for both teacher and student, the Houghton Mifflin program incorporates several important features.

- A step-by-step development of the subtraction algorithm is contained in Unit 5 and continued in Unit 11. Unit 5 leads the student to the boundary of two- and three-digit subtraction. Unit 11 provides a quite thorough treatment of three-digit subtraction and satisfies the vital need for subtraction review required by most Grade 3 students.
- The place-value decisions and manipulations (regrouping, trading) are a focus throughout; they are presented concretely and symbolically and are practised both in isolation and within the context of the algorithm.
- Other vital subtraction skills are carefully treated including changing from horizontal to vertical form, using subtraction to find a difference, checking an answer with the inverse operation, and choosing between addition and subtraction for problem solving.
- As an enjoyable counterpoint to computation, one lesson and several Enrichment sections are devoted to geometry. Not only is this geometry well integrated with the Winter theme, but it acts as a buffer to allow students time to digest subtraction concepts

and to give teachers an opportunity to remediate subtraction difficulties.

It is highly recommended that place-value materials (base ten number blocks, and a subtraction grid) be available to all students for exercises and practice. Such materials should be organized and used so as to *model* the subtraction procedure as closely as possible. A physical embodiment of the subtraction algorithm is probably the most effective instructional strategy available. Experience suggests that students make the transition from concrete materials and recording to symbolic manipulation only when they are ready for such a step.

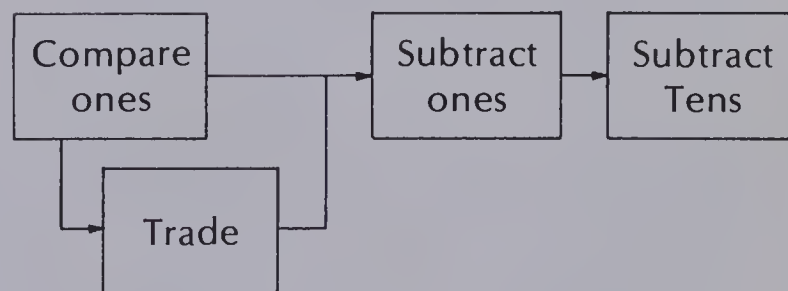
Similarly, the use of the subtraction Fact Master (see the introduction to Unit 2) can be a crucial aid for students who have not mastered some of the basic facts. Within Unit 5, basic facts errors are noteworthy, but should not be the *focus of concern*; rather, the understanding and skillful execution of the subtraction procedure (as a sequential process) should be the goal.

100s	10s	1s

Addition and subtraction grid

Subtraction Fact Master

+	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										



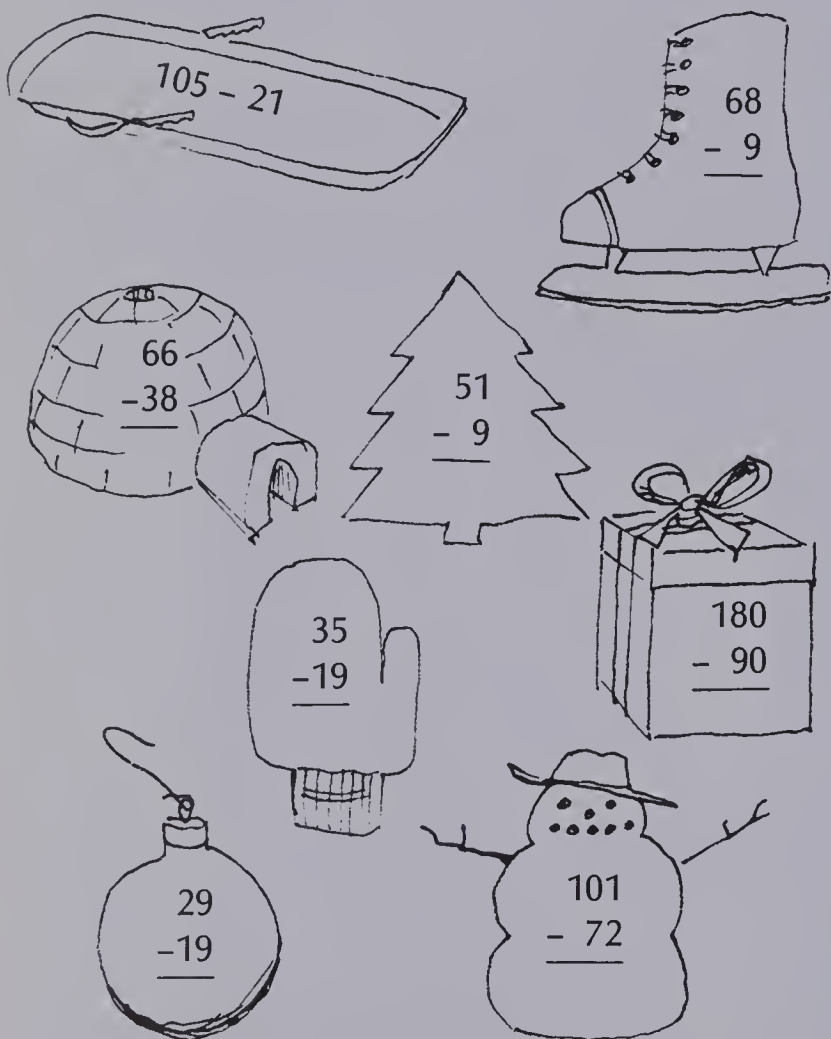
Subtraction procedure

# Ideas

Unit 5 takes winter as its integrative theme. A wide range of wintertime activities and subjects are presented in the student text and suggested in the Reinforcement and Enrichment sections of the teacher's notes. Below are listed more ideas in three categories: subtraction games, winter poetry, and geometry crafts.

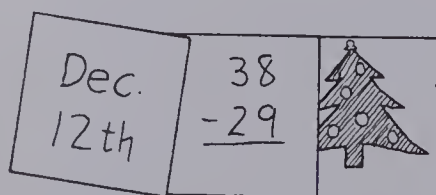
## 1. Subtraction Work cards

Subtraction work cards are more motivating when placed on *wintertime* figures. Try these!



## 2. Holiday Calendar

Have the children paint a mural. For each of the days remaining until vacation cut out a 5-10 cm square from the mural. In each of the resulting square holes place: first, a small picture; over this picture place a subtraction question; and finally, the original mural square with an inscribed date. To uncover the small picture someone must complete the subtraction problem.



## 3. All-Go Game

All-Go is a speeded up Bingo game to be used with the word-problem *pair* cards.

Use the 50 word problem work cards previously prepared by the students in Unit 4, Lesson 8. To play All-Go 20 to 30 min are needed. For each player provide a worksheet with a blank Bingo-like 5-by-5 grid. The leader randomly selects and calls out the 50 answer pairs from the second set of work cards. As this occurs, each player prepares one (or two) All-Go grids by recording 25 of these answer pairs on the grid, i.e. one pair of answers per call.

To play All-Go distribute one work card per player and spread the rest on a large table. Say, "All-Go." At once, each player determines both answers, checks the All-Go grid for this answer pair, if possible records the number of the work card in the correct cell, and then trades the work card for another from the large table. The first player to have a card with 5 cells filled across, down, or diagonally calls out, "All-Stop." This player's card can easily be checked with the answer cards. As a variation, allow some players to work with a partner.

All-Go									
56	17	35	12	81	12	63	18	45	12
		25						8	
91	43	63	22	35	64	16	87	19	52
		6				43			
63	18	12	91	26	35	42	56	78	19
				2				17	
25	75	32	62	19	11	76	58	42	35
		12							
91	87	85	13	21	64	62	85	33	62
35						32			

## 4. Winter Time Poetry

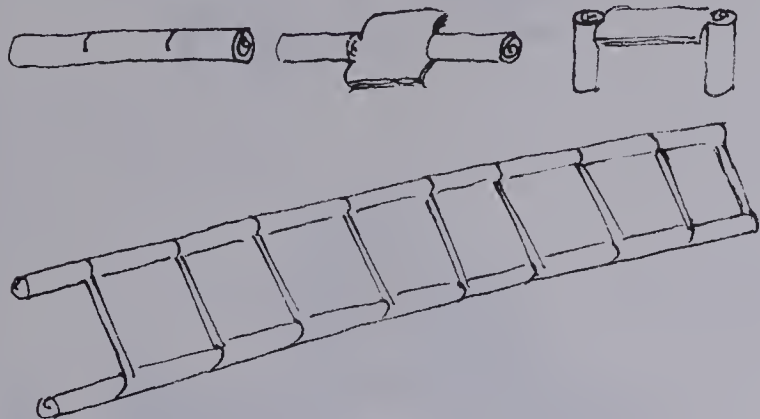
Have the children follow a set structure to compose winter poetry.

	example:
a noun	SNOW
2 adjectives	Silent, sleepy
3 verbs	Cover, shelter, protect
6-beat phrase	Nature's winter blanket
the noun repeated	Snow



### *Santa's Ladder*

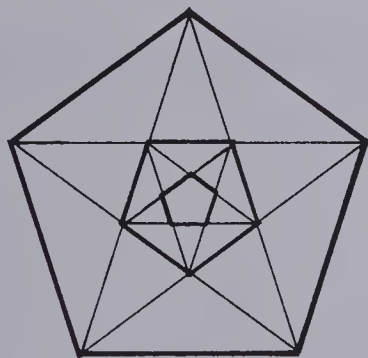
Tightly roll up newspaper or wrapping paper as shown. Snip exactly half way through, cut lengthwise, and bend out. Fold the ends down now and carefully pull out Santa's ladder.



"Stained-glass windows" can easily be constructed from black construction paper and coloured cellophane. Encourage symmetry and simple, closed figures in the designs.



Have the children trace a large pentagon. Demonstrate, using a ruler, how to draw a converging sequence of stars and pentagons.



# UNIT 5

## SUBTRACTION I



Unit 5 Objective	Test Questions	Pages
A16	1-5	82-83
A17	6-10	84-85
A18	11-15	86-87
A19	16-20	90-91
A20	21-28	92-93
A21	29-32	94-95
PS	33-34	

### Pretest

Subtract.

	Unit			
1. $\begin{array}{r} 48 \\ - 25 \\ \hline 23 \end{array}$	2. $\begin{array}{r} 63 \\ - 41 \\ \hline 22 \end{array}$	3. $\begin{array}{r} 97 \\ - 40 \\ \hline 57 \end{array}$	4. $\begin{array}{r} 79 \\ - 36 \\ \hline 43 \end{array}$	5. $\begin{array}{r} 85 \\ - 64 \\ \hline 21 \end{array}$
6. $\begin{array}{r} 33 \\ - 5 \\ \hline 28 \end{array}$	7. $\begin{array}{r} 84 \\ - 9 \\ \hline 75 \end{array}$	8. $\begin{array}{r} 62 \\ - 7 \\ \hline 55 \end{array}$	9. $\begin{array}{r} 56 \\ - 8 \\ \hline 48 \end{array}$	10. $\begin{array}{r} 91 \\ - 5 \\ \hline 86 \end{array}$
11. $\begin{array}{r} 26 \\ - 17 \\ \hline 9 \end{array}$	12. $\begin{array}{r} 56 \\ - 29 \\ \hline 27 \end{array}$	13. $\begin{array}{r} 61 \\ - 47 \\ \hline 14 \end{array}$	14. $\begin{array}{r} 83 \\ - 74 \\ \hline 9 \end{array}$	15. $\begin{array}{r} 92 \\ - 28 \\ \hline 64 \end{array}$
16. $\begin{array}{r} 170 \\ - 90 \\ \hline 80 \end{array}$	17. $\begin{array}{r} 163 \\ - 72 \\ \hline 91 \end{array}$	18. $\begin{array}{r} 134 \\ - 54 \\ \hline 80 \end{array}$	19. $\begin{array}{r} 172 \\ - 88 \\ \hline 84 \end{array}$	20. $\begin{array}{r} 111 \\ - 56 \\ \hline 55 \end{array}$



# A Subtraction Course



Try to get to the bottom quickly without falling.

- |  |  |  |  |  |
|--|--|--|--|--|
| 1. $\begin{array}{r} 2 \\ -1 \\ \hline 1 \end{array}$  | 2. $\begin{array}{r} 10 \\ -1 \\ \hline 9 \end{array}$ | 3. $\begin{array}{r} 5 \\ -1 \\ \hline 4 \end{array}$  | 4. $\begin{array}{r} 10 \\ -5 \\ \hline 5 \end{array}$ | 5. $\begin{array}{r} 8 \\ -2 \\ \hline 6 \end{array}$    |
| 6. $\begin{array}{r} 12 \\ -6 \\ \hline 6 \end{array}$ | 7. $\begin{array}{r} 10 \\ -6 \\ \hline 4 \end{array}$ | 8. $\begin{array}{r} 18 \\ -9 \\ \hline 9 \end{array}$ | 9. $\begin{array}{r} 10 \\ -2 \\ \hline 8 \end{array}$ | 10. $\begin{array}{r} 15 \\ -5 \\ \hline 10 \end{array}$ |

- |   |   |  |   |   |
|---|---|--|---|---|
| 11. $\begin{array}{r} 12 \\ -3 \\ \hline 9 \end{array}$ | 12. $\begin{array}{r} 15 \\ -9 \\ \hline 6 \end{array}$ | 13. $\begin{array}{r} 12 \\ -10 \\ \hline 2 \end{array}$ | 14. $\begin{array}{r} 14 \\ -7 \\ \hline 7 \end{array}$ | 15. $\begin{array}{r} 11 \\ -3 \\ \hline 8 \end{array}$ |
| 16. $\begin{array}{r} 13 \\ -9 \\ \hline 4 \end{array}$ | 17. $\begin{array}{r} 16 \\ -8 \\ \hline 8 \end{array}$ | 18. $\begin{array}{r} 14 \\ -10 \\ \hline 4 \end{array}$ | 19. $\begin{array}{r} 17 \\ -9 \\ \hline 8 \end{array}$ | 20. $\begin{array}{r} 15 \\ -8 \\ \hline 7 \end{array}$ |

- |  |   |   |   |   |
|--|---|---|---|---|
| 21. $\begin{array}{r} 13 \\ -3 \\ \hline 10 \end{array}$ | 22. $\begin{array}{r} 13 \\ -6 \\ \hline 7 \end{array}$ | 23. $\begin{array}{r} 13 \\ -7 \\ \hline 6 \end{array}$ | 24. $\begin{array}{r} 14 \\ -5 \\ \hline 9 \end{array}$ | 25. $\begin{array}{r} 11 \\ -4 \\ \hline 7 \end{array}$ |
| 26. $\begin{array}{r} 13 \\ -7 \\ \hline 6 \end{array}$  | 27. $\begin{array}{r} 17 \\ -8 \\ \hline 9 \end{array}$ | 28. $\begin{array}{r} 13 \\ -5 \\ \hline 8 \end{array}$ | 29. $\begin{array}{r} 12 \\ -5 \\ \hline 7 \end{array}$ | 30. $\begin{array}{r} 15 \\ -7 \\ \hline 8 \end{array}$ |



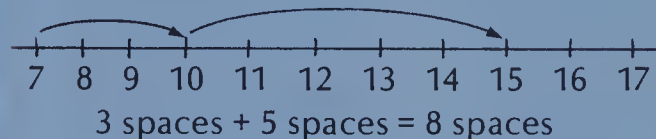
81

## UNIT 5 PREVIEW

### Suggestions

Use flash cards to review subtraction problems involving **take away 10** and **take away from 10**. Review the *bridging with 10* strategy used in Lesson 7 of Unit 2, page 34, with this example.

$$15 - 7 = 8$$



Explain that this method is helpful, but that one should still memorize the subtraction facts.

### About the Page

Introduce the ski race on page 80 as a means of encouraging instant recall of basic subtraction facts. Separate the class into pairs. As one student descends the slope (says the answers orally) the other student follows the answer key on page 83 watching for errors. A mistaken answer signifies a fall and means the students switch roles as skier and checker. Challenge the students to finish the ski run without errors in less than 90 s. Allowing only 3 s per problem forces the use of recall rather than a computation strategy. Post individual times to encourage increased speed. Stress self-improvement, rather than competition.

### Reinforcement

Make a deck of cards using the subtraction facts and play this matching game. At the start, all cards are face down and each player chooses four cards. When a player has two cards with the same answer, he or she lays it on the table and draws two more cards from the pile. If the player has no matches, he or she may exchange one card for a new one from the pile. Cards are laid on the table only at the beginning of turns. Players take turns. The player with the most matches after all cards have been drawn wins.

- |  |   |  |  |  |
|--|---|--|--|--|
| 130  | 22. 103   | 23. 101  | 24. 107  | 25. 100  |
| $\begin{array}{r} 130 \\ -74 \\ \hline 56 \end{array}$ | $\begin{array}{r} 103 \\ -95 \\ \hline 8 \end{array}$ | $\begin{array}{r} 101 \\ -82 \\ \hline 19 \end{array}$ | $\begin{array}{r} 107 \\ -29 \\ \hline 78 \end{array}$ | $\begin{array}{r} 100 \\ -38 \\ \hline 62 \end{array}$ |

the difference between:

- |                     |                          |                          |
|---------------------|--------------------------|--------------------------|
| 38 and 73 <b>35</b> | 27. 126 and 87 <b>39</b> | 28. 48 and 105 <b>57</b> |
|---------------------|--------------------------|--------------------------|

the problem. Then check the answer.

- |   |  |   |  |
|---|--|---|--|
| 64 <b>89</b>  | 30. 83 <b>182</b>                                      | 31. 54 <b>42</b>                                      | 32. 127  |
| $\begin{array}{r} 64 \\ -25 \\ \hline 39 \end{array}$ | $\begin{array}{r} 83 \\ +99 \\ \hline 182 \end{array}$ | $\begin{array}{r} 54 \\ -12 \\ \hline 42 \end{array}$ | $\begin{array}{r} 127 \\ -89 \\ \hline 38 \end{array}$ |

64 cm teddy bear  
48 cm rag doll

- |  |               |
|--|---------------|
| 33. How much longer is the teddy bear? | <b>38</b>     |
| 34. How long together?                 | <b>112 cm</b> |

## Objective A16

Subtract two-digit numerals without regrouping.

## Introducing the Lesson

Practise orally the subtraction of objects.

7 icicles minus 2 icicles = 5 icicles

Then subtract using tens.

7 tens minus 2 tens = 5 tens  
 $70 - 20 = 50$

As shown at the top of page 82, point out that if you can subtract *ones* you can also subtract *tens*.

## Teaching the Lesson

Focus on the subtracting of *tens* with these examples.

$80 - 20 = 60$      $90 - 70 = 20$      $60 - 40 = 20$   
 $70 - 30 = 40$

Discuss the meaning of **vertical** and **horizontal form**. Have the children point out which problems are in vertical form and which are in horizontal form.

Focus on the subtracting of *tens* with these examples.

$60 - 40 = 20$      $50 - 30 = 20$      $90 - 10 = 80$   
 $70 - 60 = 10$

Write these examples on the chalkboard.

$84 - 21 = 63$      $96 - 73 = 23$      $63 - 42 = 21$   
 $75 - 20 = 55$

Explain the process of two-digit subtraction without trading as shown on page 82. If necessary, build models of these problems with number blocks.

Have the students demonstrate changing horizontal examples to the vertical format on the chalkboard. Stress careful alignment of the ones and tens. Explain that horizontal problems may be changed to vertical form to make subtraction easier.

## Subtracting Tens

If you know how to subtract ones, then you can also subtract tens.

$$7 - 2 = 5$$

$$70 - 20 = 50$$

$$7 \text{ ones} - 2 \text{ ones} = 5 \text{ ones}$$

$$7 \text{ tens} - 2 \text{ tens} = 5 \text{ tens}$$

Horizontal subtraction can be changed into vertical subtraction.

$$\begin{array}{r} 73 - 21 \\ \text{becomes} \end{array}$$

First subtract the ones.

$$\begin{array}{r} 73 \\ -21 \\ \hline 2 \end{array}$$

Then subtract the tens.

$$\begin{array}{r} 73 \\ -21 \\ \hline 52 \end{array}$$

## EXERCISES

Change to vertical form. Then subtract.

- $30 - 10 = 20$
- $50 - 20 = 30$
- $90 - 30 = 60$
- $73 - 52 = 21$
- $73 - 41 = 32$
- $73 - 32 = 41$
- $86 - 34 = 52$
- $86 - 23 = 63$
- $86 - 51 = 35$
- $98 - 52 = 46$
- $98 - 36 = 62$
- $98 - 39 = 59$

## Using the Exercises

- Questions 1 to 3 deal with subtracting tens only.
- Questions 4 to 11 involve subtracting ones and tens without regrouping. See that the students correctly transfer the horizontal format to the vertical.
- Question 12 requires proper alignment in the ones place.



## PRACTICE

Subtract.

1.  $\begin{array}{r} 82 \\ -61 \\ \hline 21 \end{array}$
2.  $\begin{array}{r} 75 \\ -25 \\ \hline 50 \end{array}$
3.  $\begin{array}{r} 74 \\ -13 \\ \hline 61 \end{array}$
4.  $\begin{array}{r} 67 \\ -24 \\ \hline 43 \end{array}$
5.  $\begin{array}{r} 69 \\ -63 \\ \hline 6 \end{array}$
6.  $\begin{array}{r} 99 \\ -39 \\ \hline 60 \end{array}$
7.  $\begin{array}{r} 89 \\ -20 \\ \hline 69 \end{array}$
8.  $\begin{array}{r} 97 \\ -73 \\ \hline 24 \end{array}$
9.  $\begin{array}{r} 86 \\ -5 \\ \hline 81 \end{array}$
10.  $\begin{array}{r} 25 \\ -23 \\ \hline 2 \end{array}$
11.  $\begin{array}{r} 45 \\ -30 \\ \hline 15 \end{array}$
12.  $\begin{array}{r} 28 \\ -23 \\ \hline 5 \end{array}$
13.  $\begin{array}{r} 78 \\ -4 \\ \hline 74 \end{array}$
14.  $\begin{array}{r} 56 \\ -50 \\ \hline 6 \end{array}$
15.  $\begin{array}{r} 63 \\ -22 \\ \hline 41 \end{array}$

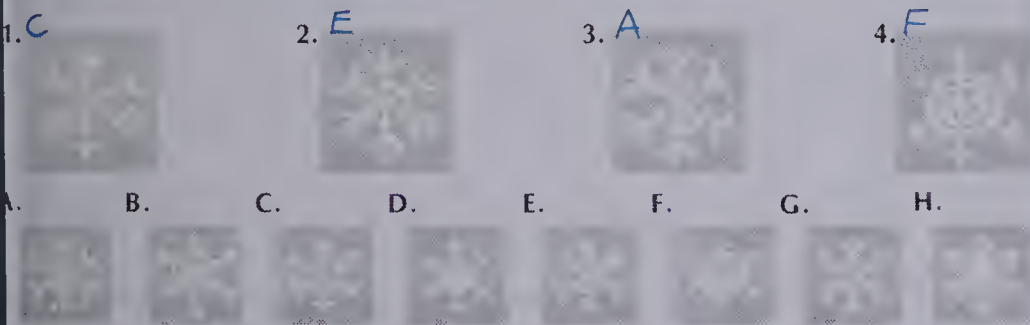
Solve by subtracting.

16. 83 snowflakes. 53 melt away. How many do not? 30
17. 73 windows. 32 snow-covered. How many are not? 41
18. 35 icicles. 5 break off. How many are left? 30
19. 3 tens less than 9 tens 60
20. 16 fewer than 79 63

Answers	Page 81	1	9	4	5	6	6	4	9
8	10	9	6	2	7	8	4	8	8
7	10	7	6	9	7	6	9	8	7

## Similar Snowflakes

Match each large snowflake with a smaller look-alike.



83

## Practice

## Worksheet A16

Pages 82-83

tract.

1.  $\begin{array}{r} 38 \\ -26 \\ \hline 12 \end{array}$
2.  $\begin{array}{r} 49 \\ -2 \\ \hline 47 \end{array}$
3.  $\begin{array}{r} 68 \\ -47 \\ \hline 21 \end{array}$
4.  $\begin{array}{r} 95 \\ -41 \\ \hline 54 \end{array}$
5.  $\begin{array}{r} 77 \\ -53 \\ \hline 24 \end{array}$

9 tens take away 4 tens = 50

7. 7 tens minus 2 tens = 50

87 take away 35 = 52

9. 26 minus 14 = 12

Take 71 away from 92. 21

11. Take 12 away from 58. 46

Subtract 14 from 29. 15

13. Subtract 36 from 97. 61

## Assigning the Practice

Minimum: 1-16

Average: 1-20

Enriched: 1-20

## Reinforcement

1. Assign *Similar Snowflakes*, page 83. Have the students cut out of thin paper two snowflakes at a time. Mix them up and display them. Encourage the class to find the similar ones.

2. Practise counting back orally by ones, twos, and threes from numbers to 99.

## Enrichment

1. Notice that the shape of the snowflakes is based on the *hexagon*. Discuss the term and then show the students how to make hexagons.

a. Fold a circular piece of paper in half.



b. Now fold the semicircle in thirds.



c. Measure 8 cm along each straight side and mark it.



d. Cut from one mark to the other. All 6 sides should be 8 cm.

2. Relate two-digit subtraction in base 10 to subtraction in base 5 using nickels and pennies. In future lessons, extend this idea to include regrouping in base 5.



4	3
-2	1
2	2

4 nickels + 3 pennies
-2 nickels + 1 penny
2 nickels + 2 pennies

## Objective A17

Subtract one-digit numerals from two-digit numerals with regrouping.

## Introducing the Lesson

Help the students recall the place value of a number by modelling with blocks.

52 = 5 tens rods, 2 ones cubes  
Model the same number with one less ten, 4 tens.

52 = 4 tens rods, 12 ones cubes  
Practise taking away or **trading a ten** for 10 ones with several numbers.  
Gradually develop this method for recording the trading process.

8 11

91 = 8 tens, 11 ones

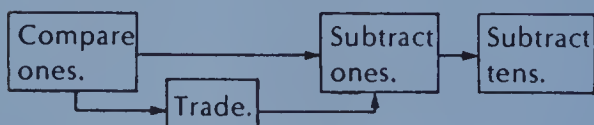
## Teaching the Lesson

Introduce the textbook example with a problem. Jimmy and his dad caught 42 fish in the Fish Derby. They threw back 8 small ones. How many fish did they keep?

Display the subtraction problem 42 - 8 on a subtraction grid and build a model with number blocks as shown on page 84. Explain that 8 ones must be removed from 42. Determine that more than the 2 ones of 42 are needed. Ask how it might be possible to get more ones. Show how 1 ten is traded for 10 ones, making 12 ones in all.



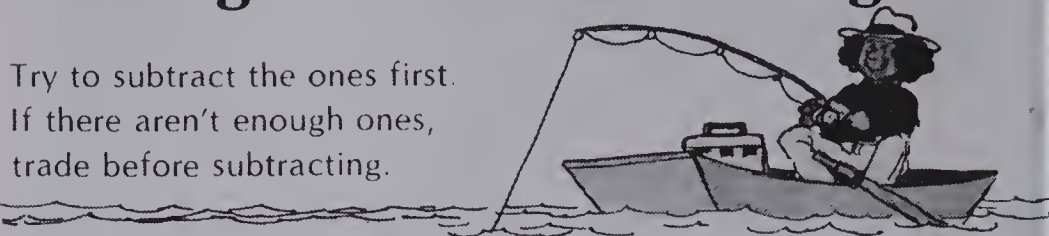
Practise this trading procedure with several other examples, verbalizing each step. Develop a flow chart of the steps.



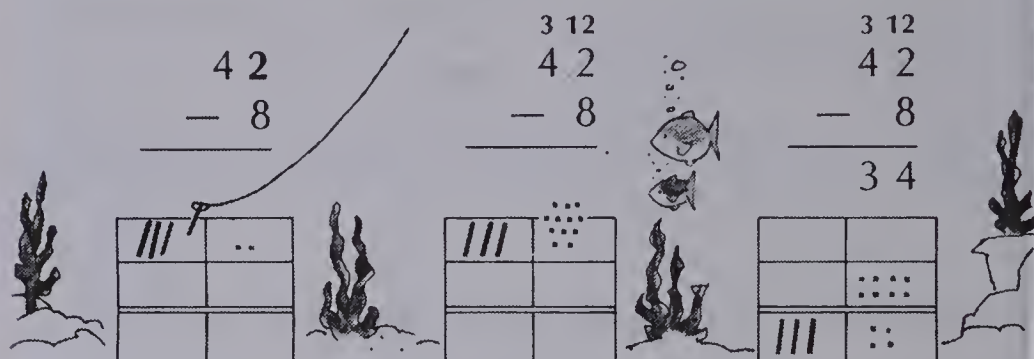
Use the flow chart for subtraction problems that do and do not require trading.

# Trading Before Subtracting

Try to subtract the ones first.  
If there aren't enough ones,  
trade before subtracting.



Not enough ones. Place value trade. 1 ten = 10 ones. Subtract the ones. Write the tens.



## EXERCISES

Show the trade.

1.  $\begin{array}{r} 42 \\ - 8 \\ \hline \end{array}$
2.  $\begin{array}{r} 612 \\ - 72 \\ \hline \end{array}$
3.  $\begin{array}{r} 218 \\ - 38 \\ \hline \end{array}$
4.  $\begin{array}{r} 111 \\ - 21 \\ \hline \end{array}$
5.  $\begin{array}{r} 817 \\ - 97 \\ \hline \end{array}$
6.  $\begin{array}{r} 613 \\ - 73 \\ \hline \end{array}$
7.  $\begin{array}{r} 310 \\ - 40 \\ \hline \end{array}$
8.  $\begin{array}{r} 517 \\ - 67 \\ \hline \end{array}$
9.  $\begin{array}{r} 012 \\ - 12 \\ \hline \end{array}$
10.  $\begin{array}{r} 610 \\ - 70 \\ \hline \end{array}$

Finish subtracting.

11.  $\begin{array}{r} 413 \\ - 53 \\ \hline \end{array}$
12.  $\begin{array}{r} 216 \\ - 36 \\ \hline \end{array}$
13.  $\begin{array}{r} 312 \\ - 42 \\ \hline \end{array}$
14.  $\begin{array}{r} 810 \\ - 90 \\ \hline \end{array}$
15.  $\begin{array}{r} 711 \\ - 81 \\ \hline \end{array}$

## Using the Exercises

- Questions 1 to 10 require that the trading of 1 ten for 10 ones be written.
- Questions 11 to 15 require the students to finish each subtraction problem after the trading has been done.



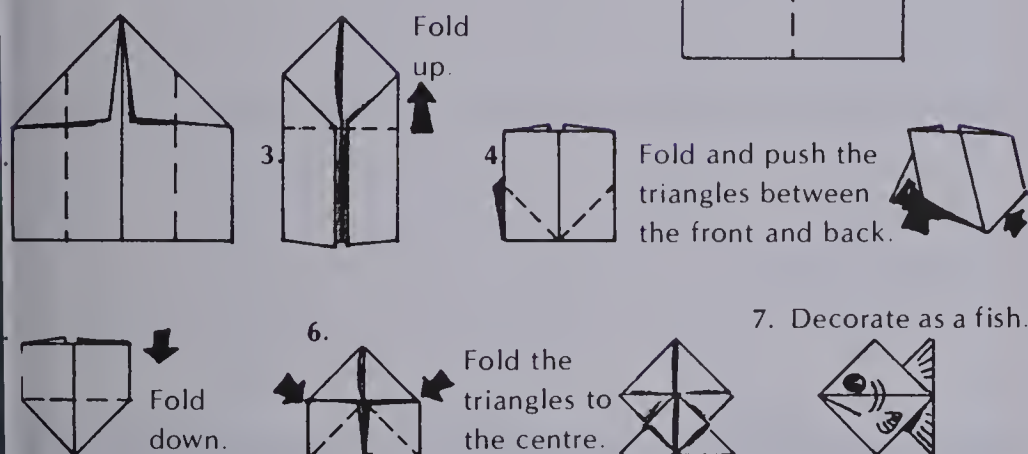
## PRACTICE

Trade if needed. Then subtract.

- |   |   |   |   |   |
|---|---|---|---|---|
| 1. $\begin{array}{r} 52 \\ - 4 \\ \hline 48 \end{array}$  | 2. $\begin{array}{r} 72 \\ - 6 \\ \hline 66 \end{array}$  | 3. $\begin{array}{r} 21 \\ - 9 \\ \hline 12 \end{array}$  | 4. $\begin{array}{r} 35 \\ - 2 \\ \hline 33 \end{array}$  | 5. $\begin{array}{r} 73 \\ - 6 \\ \hline 67 \end{array}$  |
| 6. $\begin{array}{r} 64 \\ - 7 \\ \hline 57 \end{array}$  | 7. $\begin{array}{r} 38 \\ - 9 \\ \hline 29 \end{array}$  | 8. $\begin{array}{r} 40 \\ - 2 \\ \hline 38 \end{array}$  | 9. $\begin{array}{r} 94 \\ - 8 \\ \hline 86 \end{array}$  | 10. $\begin{array}{r} 55 \\ - 4 \\ \hline 51 \end{array}$ |
| 11. $\begin{array}{r} 68 \\ - 9 \\ \hline 59 \end{array}$ | 12. $\begin{array}{r} 73 \\ - 7 \\ \hline 66 \end{array}$ | 13. $\begin{array}{r} 29 \\ - 2 \\ \hline 27 \end{array}$ | 14. $\begin{array}{r} 65 \\ - 7 \\ \hline 58 \end{array}$ | 15. $\begin{array}{r} 70 \\ - 6 \\ \hline 64 \end{array}$ |
| 16. $\begin{array}{r} 68 \\ - 4 \\ \hline 64 \end{array}$ | 17. $\begin{array}{r} 90 \\ - 1 \\ \hline 89 \end{array}$ | 18. $\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$  | 19. $\begin{array}{r} 97 \\ - 9 \\ \hline 88 \end{array}$ | 20. $\begin{array}{r} 41 \\ - 8 \\ \hline 33 \end{array}$ |

## ORIGAMI FISH

Start with a **square** piece of paper.  
Fold on the dotted lines.



## Practice

Now the trade.

- |   |   |   |   |  |
|---|---|---|---|--|
| 1. $\begin{array}{r} 215 \\ - 35 \\ \hline 180 \end{array}$ | 2. $\begin{array}{r} 414 \\ - 54 \\ \hline 360 \end{array}$ | 3. $\begin{array}{r} 313 \\ - 43 \\ \hline 270 \end{array}$ | 4. $\begin{array}{r} 511 \\ - 61 \\ \hline 450 \end{array}$ | 5. $\begin{array}{r} 117 \\ - 27 \\ \hline 90 \end{array}$   |
| 6. $\begin{array}{r} 512 \\ - 62 \\ \hline 450 \end{array}$ | 7. $\begin{array}{r} 618 \\ - 78 \\ \hline 540 \end{array}$ | 8. $\begin{array}{r} 715 \\ - 85 \\ \hline 630 \end{array}$ | 9. $\begin{array}{r} 417 \\ - 57 \\ \hline 360 \end{array}$ | 10. $\begin{array}{r} 810 \\ - 90 \\ \hline 720 \end{array}$ |

tract

- |   |   |   |   |   |
|---|---|---|---|---|
| 11. $\begin{array}{r} 35 \\ - 9 \\ \hline 26 \end{array}$ | 12. $\begin{array}{r} 54 \\ - 7 \\ \hline 47 \end{array}$ | 13. $\begin{array}{r} 60 \\ - 8 \\ \hline 52 \end{array}$ | 14. $\begin{array}{r} 43 \\ - 6 \\ \hline 37 \end{array}$ | 15. $\begin{array}{r} 61 \\ - 2 \\ \hline 59 \end{array}$ |
|---|---|---|---|---|

16.  $72 - 6 = 66$       17.  $40 - 9 = 31$       18.  $54 - 6 = 48$

## Assigning the Practice

Minimum: 1-20

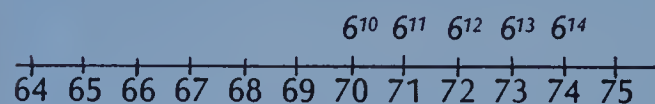
Average: 1-20

Enriched: 1-20

## Reinforcement

1. Use a number line to 100 to illustrate this lesson's subtraction method.

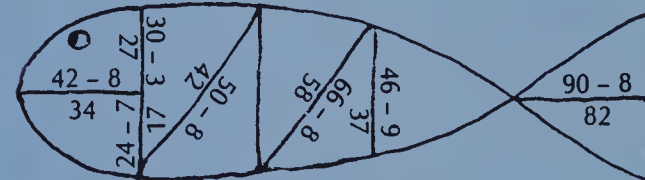
$$14 - 9 = 5$$



$$74 - 9 = 65$$

2. Use a 100 chart to demonstrate the subtraction of one-digit numbers from two-digit numbers.

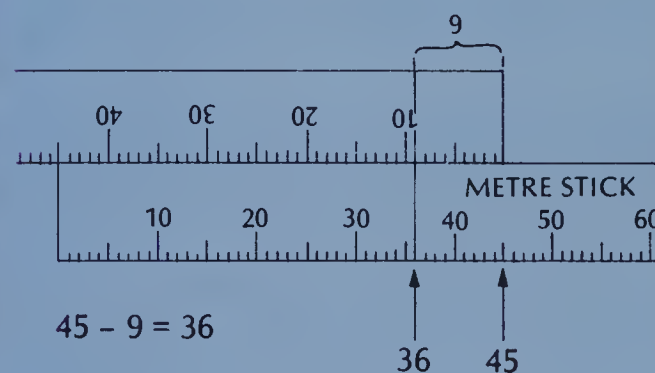
3. Prepare this fish puzzle for the students to cut out and paste together again on stiff paper.



## Enrichment

1. Assign *Origami Fish*, page 85.

2. Demonstrate how an addition and subtraction slide-rule can be devised from two metre sticks.



# UNIT 5 LESSON 3

## Objective A18

Subtract two-digit numerals with regrouping.

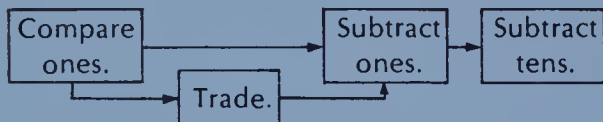
## Introducing the Lesson

Write the following problems on the chalkboard and have the students *compare the ones* in each. Encourage them to use different terms (*minus, less, subtract, or take away*). Differentiate between cases requiring *trading* and those which do not.

$$\begin{array}{r} 63 \\ -17 \\ \hline \end{array} \quad \begin{array}{r} 63 \\ -12 \\ \hline \end{array} \quad \begin{array}{r} 57 \\ -15 \\ \hline \end{array} \quad \begin{array}{r} 57 \\ -19 \\ \hline \end{array} \quad \begin{array}{r} 21 \\ -11 \\ \hline \end{array} \quad \begin{array}{r} 21 \\ -14 \\ \hline \end{array}$$

## Teaching the Lesson

Using a grid and number blocks, model the subtraction problem shown on page 86. Discuss the steps involved.



Practise this procedure with several similar problems. Record the way trading is shown on a subtraction problem at the chalkboard.

$$\begin{array}{r} 716 \\ 86 \\ -29 \\ \hline 57 \end{array}$$

Write subtraction problems in horizontal form on the chalkboard. Have the students rewrite them in vertical form, decide if trading is required, and subtract. Check their work for proper alignment of ones and tens.

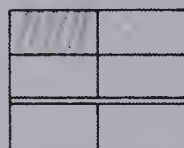
# Two-Place Subtraction

Compare the ones first.  
Don't trade unless you have to.

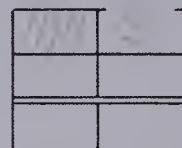


Place value trade.      Subtract the ones.  
Not enough ones.      1 ten = 10 ones.      Subtract the tens.

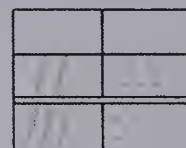
$$\begin{array}{r} 63 \\ -27 \\ \hline \end{array}$$



$$\begin{array}{r} 513 \\ 63 \\ -27 \\ \hline \end{array}$$



$$\begin{array}{r} 513 \\ 63 \\ -27 \\ \hline 36 \end{array}$$



## EXERCISES

Write **trade** or **no trade**.

$$\begin{array}{r} 53 \\ -17 \\ \hline 36 \\ \text{trade} \end{array}$$

$$\begin{array}{r} 57 \\ -13 \\ \hline 44 \\ \text{no trade} \end{array}$$

$$\begin{array}{r} 68 \\ -35 \\ \hline 33 \\ \text{no trade} \end{array}$$

$$\begin{array}{r} 65 \\ -38 \\ \hline 27 \\ \text{trade} \end{array}$$

$$\begin{array}{r} 55 \\ -35 \\ \hline 20 \\ \text{no trade} \end{array}$$

Practise trading.

$$\begin{array}{r} 235 \\ 78 \\ \hline \end{array}$$

$$\begin{array}{r} 127 \\ 34 \\ \hline \end{array}$$

$$\begin{array}{r} 513 \\ 63 \\ \hline \end{array}$$

$$\begin{array}{r} 342 \\ 83 \\ \hline \end{array}$$

$$\begin{array}{r} 455 \\ 90 \\ \hline \end{array}$$

$$\begin{array}{r} 678 \\ 78 \\ \hline \end{array}$$

$$\begin{array}{r} 234 \\ 34 \\ \hline \end{array}$$

$$\begin{array}{r} 450 \\ 50 \\ \hline \end{array}$$

$$\begin{array}{r} 713 \\ 83 \\ \hline \end{array}$$

$$\begin{array}{r} 890 \\ 90 \\ \hline \end{array}$$

## Using the Exercises

- Questions 1 to 5 involve only a decision to trade or not.
- Questions 6 to 15 require the students to show how 1 ten is traded for 10 ones.



# PRACTICE

Subtract.

1.  $\begin{array}{r} 52 \\ -24 \\ \hline 28 \end{array}$
2.  $\begin{array}{r} 72 \\ -46 \\ \hline 26 \end{array}$
3.  $\begin{array}{r} 21 \\ -19 \\ \hline 2 \end{array}$
4.  $\begin{array}{r} 35 \\ -12 \\ \hline 23 \end{array}$
5.  $\begin{array}{r} 73 \\ -56 \\ \hline 17 \end{array}$
6.  $\begin{array}{r} 64 \\ -27 \\ \hline 37 \end{array}$
7.  $\begin{array}{r} 38 \\ -19 \\ \hline 19 \end{array}$
8.  $\begin{array}{r} 40 \\ -29 \\ \hline 11 \end{array}$
9.  $\begin{array}{r} 94 \\ -78 \\ \hline 16 \end{array}$
10.  $\begin{array}{r} 55 \\ -20 \\ \hline 35 \end{array}$
11.  $\begin{array}{r} 68 \\ -59 \\ \hline 9 \end{array}$
12.  $\begin{array}{r} 73 \\ -37 \\ \hline 36 \end{array}$
13.  $\begin{array}{r} 29 \\ -22 \\ \hline 7 \end{array}$
14.  $\begin{array}{r} 65 \\ -37 \\ \hline 28 \end{array}$
15.  $\begin{array}{r} 70 \\ -56 \\ \hline 14 \end{array}$
16.  $\begin{array}{r} 65 \\ -32 \\ \hline 33 \end{array}$
17.  $\begin{array}{r} 53 \\ -28 \\ \hline 25 \end{array}$
18.  $\begin{array}{r} 29 \\ -17 \\ \hline 12 \end{array}$
19.  $\begin{array}{r} 54 \\ -27 \\ \hline 27 \end{array}$
20.  $\begin{array}{r} 28 \\ -9 \\ \hline 19 \end{array}$
21.  $\begin{array}{r} 56 \\ -37 \\ \hline 19 \end{array}$
22.  $\begin{array}{r} 99 \\ -56 \\ \hline 43 \end{array}$
23.  $\begin{array}{r} 27 \\ -19 \\ \hline 8 \end{array}$
24.  $\begin{array}{r} 85 \\ -67 \\ \hline 18 \end{array}$
25.  $\begin{array}{r} 40 \\ -11 \\ \hline 29 \end{array}$

Change to vertical form. Then subtract.

26.  $68 - 24 = 44$
27.  $90 - 61 = 29$
28.  $32 - 16 = 16$
29.  $97 - 79 = 18$
30.  $41 - 28 = 13$
31.  $87 - 27 = 60$
32.  $60 - 12 = 48$
33.  $86 - 59 = 27$
34.  $61 - 17 = 44$

Can you do these?

Subtract across

- Subtract down
- 34 18  $\blacksquare$  16
  - 21 9  $\blacksquare$  12
  - $\blacksquare$   $\blacksquare$   $\blacksquare$  4
  - 13 9  $\blacksquare$  4
  - 82 28  $\blacksquare$  54
  - 37 18  $\blacksquare$  19
  - $\blacksquare$   $\blacksquare$   $\blacksquare$  35
  - 45 10  $\blacksquare$  35
  - 90 65  $\blacksquare$  25
  - 54 29  $\blacksquare$  25
  - $\blacksquare$   $\blacksquare$   $\blacksquare$  0
  - 36 36  $\blacksquare$  0

87

Extra Practice

Worksheet A18

Pages 86-87

Subtract.

1.  $\begin{array}{r} 35 \\ -19 \\ \hline 16 \end{array}$
2.  $\begin{array}{r} 42 \\ -23 \\ \hline 19 \end{array}$
3.  $\begin{array}{r} 65 \\ -38 \\ \hline 27 \end{array}$
4.  $\begin{array}{r} 92 \\ -89 \\ \hline 3 \end{array}$
5.  $\begin{array}{r} 83 \\ -24 \\ \hline 59 \end{array}$
6.  $\begin{array}{r} 70 \\ -29 \\ \hline 41 \end{array}$
7.  $\begin{array}{r} 58 \\ -49 \\ \hline 9 \end{array}$
8.  $\begin{array}{r} 80 \\ -37 \\ \hline 43 \end{array}$
9.  $\begin{array}{r} 61 \\ -57 \\ \hline 4 \end{array}$
10.  $\begin{array}{r} 22 \\ -13 \\ \hline 9 \end{array}$

Change to vertical form. Then subtract.

11.  $75 - 24 = 51$
12.  $90 - 3 = 87$
13.  $48 - 38 = 10$

## Assigning the Practice

Minimum: 1-20, 26-28

Average: 6-34

Enriched: 6-34

## Reinforcement

1. Before assigning *Can you do these?*, practise completing similar tables with the students.

73	27	$\blacksquare$
39	14	$\blacksquare$
$\blacksquare$	$\blacksquare$	$\blacksquare$

2. Choose a few special future dates in the current month (Christmas, December 25, or New Years Eve, December 31). Have the students subtract today's date from these dates to determine how many days remain.

3. Have the students complete this magic square.

17	24			15
23	5	7		
4	6	13		22
10	12	19		
11		25		9

## Enrichment

1. Provide a worksheet with *Betty Brackets* problems as given in Lesson 6, Unit 1, page 13.

$$(24 + 36) - 19 = \blacksquare \blacksquare \blacksquare$$

$$72 - (18 + 14) = \blacksquare \blacksquare \blacksquare$$

$$(37 + 49) - 58 = \blacksquare \blacksquare \blacksquare$$

2. Investigate using a *Shifting Up to Tens* method for subtracting 2 two-digit numerals.

75	+ 2	77	93	+ 5	98
-28	+ 2	-30	-65	+ 5	-70
		47			28
83	+ 1	84	81	+ 6	87
-49	+ 1	-50	-64	+ 6	-70
		34			17

## Objective G1

Identify and construct common-plane closed figures.

## Introducing the Lesson

Begin a discussion about **solid** objects (3 dimensional) and **plane figures** (2 dimensional or flat) and point out their differences. Introduce the word *plane* and provide several cardboard shapes (squares, rectangles, triangles, circles, etc.) as examples.

Discuss the fact that some plane figures have an *inside* and an *outside*, while others do not. Use plane figure flash cards to illustrate this. Separate the cards into two categories:

- those with insides and outsides



- those without insides.



Name those plane figures shown on page 88: **circle, square, triangle, rectangle**. Point out the top of page 88 for further explanation of these concepts.

## Teaching the Lesson

Using a set of plane figure display cards (circles, squares, rectangles, triangles), have the students decide on the properties of each figure.

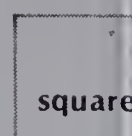
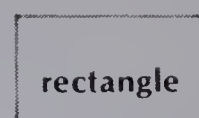
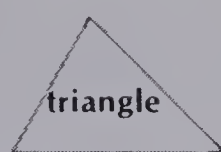
- Does it have *straight* sides?  
How many?
- Are any sides the same length?  
How many?
- Does it have *curved* sides?
- Does it have corners?  
How many are L-corners?

Sort all the squares, circles, triangles, and rectangles from the plane figure cards into separate piles. Note that all squares, for example, have the same properties:

- 4 straight sides
- 4 equal sides
- no curved sides
- 4 L-corners.

# Plane Figures

Each of these figures has an inside.

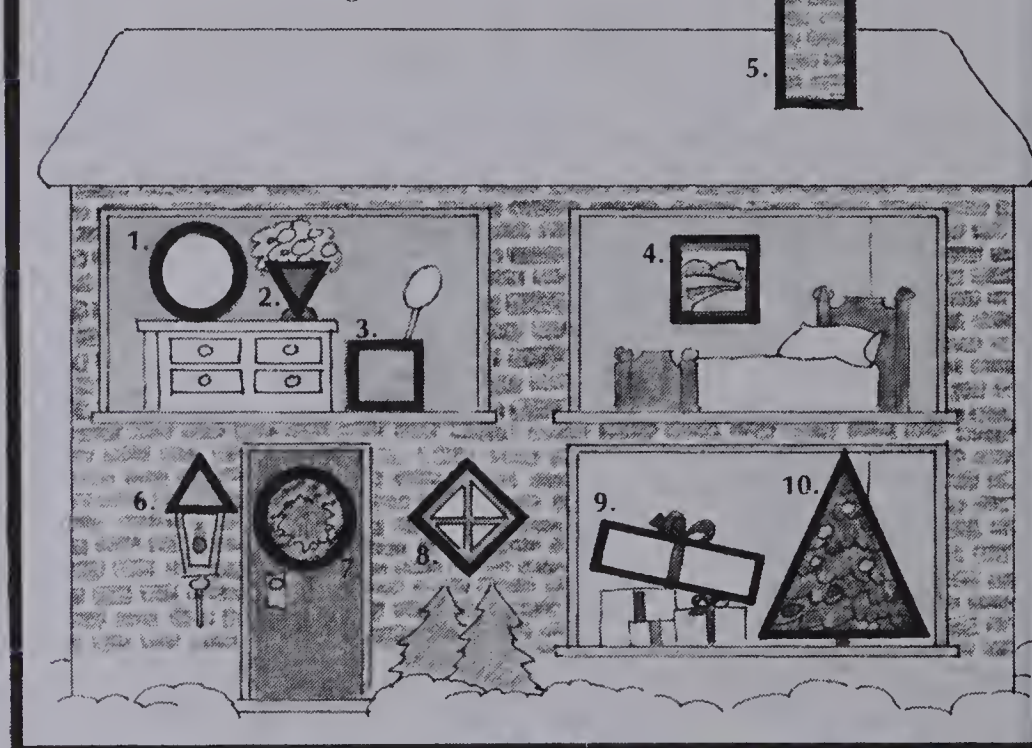


None of these figures has an inside.



## EXERCISES

Name each black figure.



88 Answers: 1. circle 2. triangle 3. square 4. square  
5. rectangle 6. triangle 7. circle 8. square 9. rectangle  
10. triangle

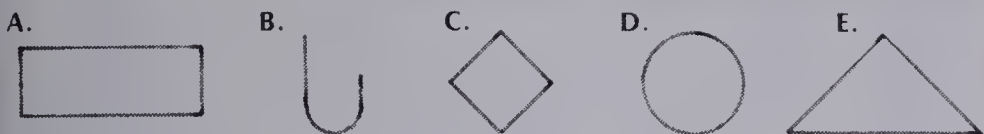
## Using the Exercises

- Questions 1 to 10 require the identification of four plane figures. Encourage the correct spelling of each.



## PRACTICE

Choose the letters.



- Which have an inside? A, C, D, E
- Which have curved sides? D
- Which have straight sides? A, C, E
- Which have corners? A, C, E
- Which have L-corners? A, C

Which figure is a:

- triangle? E
- square? C
- circle? D
- rectangle? A

10. Copy and complete the chart.

	Circle	Triangle	Square	Rectangle
Number of corners	0	3	4	4
Number of sides	0	3	4	4

## REVIEW

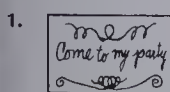
Subtract.

A16	1. $\begin{array}{r} 36 \\ -13 \\ \hline 23 \end{array}$	2. $\begin{array}{r} 59 \\ -43 \\ \hline 16 \end{array}$	3. $\begin{array}{r} 84 \\ -14 \\ \hline 70 \end{array}$	4. $\begin{array}{r} 93 \\ -91 \\ \hline 2 \end{array}$	5. $\begin{array}{r} 75 \\ -20 \\ \hline 55 \end{array}$
A17	6. $\begin{array}{r} 33 \\ -6 \\ \hline 27 \end{array}$	7. $\begin{array}{r} 53 \\ -9 \\ \hline 44 \end{array}$	8. $\begin{array}{r} 64 \\ -4 \\ \hline 60 \end{array}$	9. $\begin{array}{r} 91 \\ -3 \\ \hline 88 \end{array}$	10. $\begin{array}{r} 70 \\ -5 \\ \hline 65 \end{array}$
A18	11. $\begin{array}{r} 76 \\ -18 \\ \hline 58 \end{array}$	12. $\begin{array}{r} 31 \\ -23 \\ \hline 8 \end{array}$	13. $\begin{array}{r} 90 \\ -32 \\ \hline 58 \end{array}$	14. $\begin{array}{r} 84 \\ -65 \\ \hline 19 \end{array}$	15. $\begin{array}{r} 43 \\ -19 \\ \hline 24 \end{array}$

89

### Extra Practice

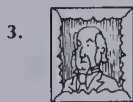
What plane figures do these suggest?



rectangle



circle



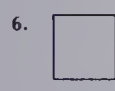
rectangle



triangle



circle



square



triangle



rectangle

9. I have 4 straight sides that are all the same length and four L-corners.

What am I? square

10. I have 3 straight sides and 3 corners. What am I? triangle

11. I have one curved side and no corners. What am I? circle

12. I have 4 straight sides of two lengths. I have four L-corners.

What am I? rectangle

### Worksheet G1

Pages 88-89

## Assigning the Practice

Minimum: 1-9

Average: 1-10

Enriched: 1-10

## Review Exercises

Questions	Objective	Pages
1-5	A16	82-83
6-10	A17	84-85
11-15	A18	86-87

## Reinforcement

1. Provide scissors, straws, toothpicks, Plasticene, construction paper, thread, and string. With these materials have the students make Christmas tree ornaments incorporating closed plane figures.



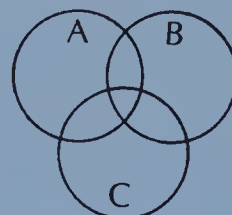
2. Encourage the children to label geometric objects around the room.

## Enrichment

1. Use attribute diagrams to classify plane figure cards, geometric pictures from magazines, or cardboard shapes.

### Venn Diagram

A: curved sides  
B: straight sides  
C: L-corners



### Carroll Diagram



closed

open

< 4 sides ≥ 4 sides

Excellent attribute activities are found in the **Weeple People** and **Colour Weeple**.

2. Make Christmas chains. Try to use as many closed plane figure designs as possible.

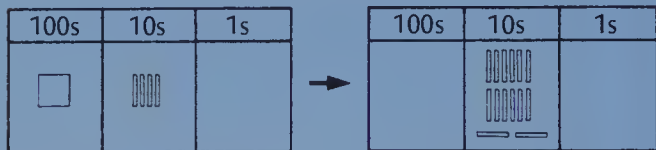


## Objective A19

Subtract two-digit numerals from three-digit numerals with two-digit differences.

### Introducing the Lesson

Using number blocks and a place-value grid, demonstrate how 140 can be regrouped as 14 tens, and 0 ones.



Model and discuss these equivalences.

- 180 → ■ tens
- 160 → ■ tens
- 164 → ■ tens 4 ones
- 187 → ■ tens 7 ones
- 105 → ■ tens 5 ones

### Teaching the Lesson

Write on the chalkboard several problems that do not require trading. Discuss as shown.

$\begin{array}{r} 124 \\ - 71 \\ \hline 53 \end{array}$	$\begin{array}{r} 12 \text{ tens } 4 \text{ ones} \\ - 7 \text{ tens } 1 \text{ one} \\ \hline 5 \text{ tens } 3 \text{ ones} \end{array}$	<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">             First subtract the ones.         </div>
---	--	---

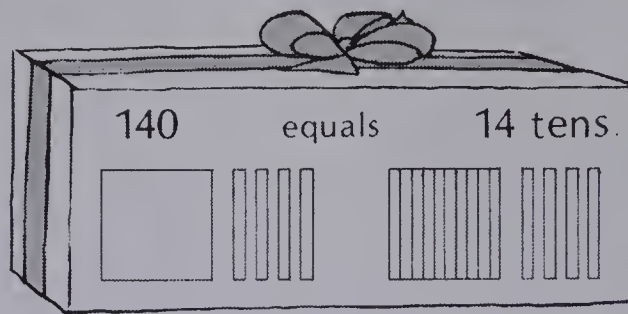
Using a subtraction grid and number blocks, demonstrate these problems focusing on the trading steps.

$\begin{array}{r} 12 \ 15 \\ 1 \ 3 \ 5 \\ - 6 \ 8 \\ \hline 6 \ 7 \end{array}$	$\begin{array}{r} 1 \ 13 \\ 1 \ 2 \ 3 \\ - 8 \ 7 \\ \hline 3 \ 6 \end{array}$	$\begin{array}{r} 6 \ 10 \\ 1 \ 7 \ 0 \\ - 9 \ 2 \\ \hline 7 \ 8 \end{array}$	$\begin{array}{r} 4 \ 18 \\ 1 \ 5 \ 8 \\ - 6 \ 9 \\ \hline 8 \ 9 \end{array}$
--	---	---	---

Focus trading one ten to the ones place with these examples.

$\begin{array}{r} 13 \ 5 \\ 1 \ 2 \ 3 \\ - 6 \ 8 \\ \hline 6 \ 7 \end{array}$	$\begin{array}{r} 12 \ 3 \\ 1 \ 1 \ 1 \\ - 8 \ 7 \\ \hline 3 \ 6 \end{array}$	$\begin{array}{r} 17 \ 0 \\ 1 \ 5 \ 8 \\ - 9 \ 2 \\ \hline 7 \ 8 \end{array}$	$\begin{array}{r} 15 \ 8 \\ 1 \ 3 \ 5 \\ - 6 \ 8 \\ \hline 8 \ 9 \end{array}$
---	---	---	---

# More about Subtracting Tens...



Study each subtraction present carefully.

$\begin{array}{r} 14 \text{ tens} \quad 140 \\ - 9 \text{ tens} \quad - 90 \\ \hline 5 \text{ tens} \quad 50 \end{array}$
---

$\begin{array}{r} 15 \text{ tens} \quad 153 \\ - 8 \text{ tens} \quad - 82 \\ \hline 7 \text{ tens} \quad 71 \end{array}$
---

$\begin{array}{r} 12 \text{ tens} \quad 125 \\ - 8 \text{ tens} \quad - 86 \\ \hline 4 \text{ tens} \quad 49 \end{array}$
---

## EXERCISES

Finish each problem.

- |  |   |   |   |
|--|---|---|---|
| 1. $\begin{array}{r} 12 \text{ tens} \quad 120 \\ - 3 \text{ tens} \quad - 30 \\ \hline 9 \text{ tens} \quad 90 \end{array}$ | 2. $\begin{array}{r} 120 \\ - 60 \\ \hline 60 \end{array}$  | 3. $\begin{array}{r} 140 \\ - 70 \\ \hline 70 \end{array}$  | 4. $\begin{array}{r} 130 \\ - 80 \\ \hline 50 \end{array}$  |
| 5. $\begin{array}{r} 11 \text{ tens} \quad 116 \\ - 8 \text{ tens} \quad - 84 \\ \hline 3 \text{ tens} \quad 32 \end{array}$ | 6. $\begin{array}{r} 135 \\ - 92 \\ \hline 43 \end{array}$  | 7. $\begin{array}{r} 157 \\ - 91 \\ \hline 66 \end{array}$  | 8. $\begin{array}{r} 144 \\ - 60 \\ \hline 84 \end{array}$  |
| 9. $\begin{array}{r} 13 \text{ tens} \quad 132 \\ - 4 \text{ tens} \quad - 48 \\ \hline 9 \text{ tens} \quad 94 \end{array}$ | 10. $\begin{array}{r} 151 \\ - 76 \\ \hline 75 \end{array}$ | 11. $\begin{array}{r} 178 \\ - 89 \\ \hline 89 \end{array}$ | 12. $\begin{array}{r} 163 \\ - 65 \\ \hline 98 \end{array}$ |

### Using the Exercises

- Questions 1 to 4 involve subtracting tens and no ones.
- Questions 5 to 8 involve subtracting without trading.
- Questions 9 to 12 require trading.



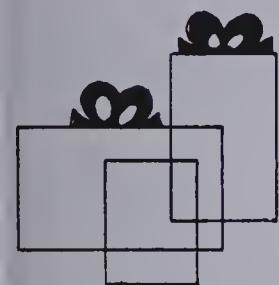
## PRACTICE

Subtract.

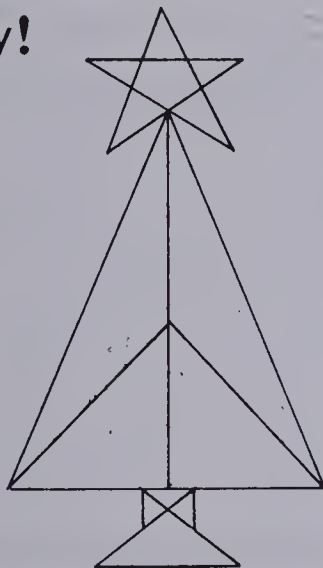
1.  $\begin{array}{r} 150 \\ - 90 \\ \hline 60 \end{array}$
2.  $\begin{array}{r} 163 \\ - 82 \\ \hline 81 \end{array}$
3.  $\begin{array}{r} 125 \\ - 33 \\ \hline 92 \end{array}$
4.  $\begin{array}{r} 136 \\ - 99 \\ \hline 37 \end{array}$
5.  $\begin{array}{r} 146 \\ - 76 \\ \hline 70 \end{array}$
6.  $\begin{array}{r} 124 \\ - 60 \\ \hline 64 \end{array}$
7.  $\begin{array}{r} 142 \\ - 88 \\ \hline 54 \end{array}$
8.  $\begin{array}{r} 131 \\ - 75 \\ \hline 56 \end{array}$
9.  $\begin{array}{r} 140 \\ - 58 \\ \hline 82 \end{array}$
10.  $\begin{array}{r} 161 \\ - 79 \\ \hline 82 \end{array}$
11.  $\begin{array}{r} 151 \\ - 83 \\ \hline 68 \end{array}$
12.  $\begin{array}{r} 113 \\ - 38 \\ \hline 75 \end{array}$
13.  $\begin{array}{r} 120 \\ - 76 \\ \hline 44 \end{array}$
14.  $\begin{array}{r} 155 \\ - 87 \\ \hline 68 \end{array}$
15.  $\begin{array}{r} 127 \\ - 56 \\ \hline 71 \end{array}$
16.  $\begin{array}{r} 149 \\ - 64 \\ \hline 85 \end{array}$
17.  $\begin{array}{r} 142 \\ - 67 \\ \hline 75 \end{array}$
18.  $\begin{array}{r} 115 \\ - 22 \\ \hline 93 \end{array}$
19.  $\begin{array}{r} 117 \\ - 88 \\ \hline 29 \end{array}$
20.  $\begin{array}{r} 140 \\ - 75 \\ \hline 65 \end{array}$
21.  $\begin{array}{r} 183 \\ - 93 \\ \hline 90 \end{array}$
22.  $\begin{array}{r} 138 \\ - 57 \\ \hline 81 \end{array}$
23.  $\begin{array}{r} 124 \\ - 83 \\ \hline 41 \end{array}$
24.  $\begin{array}{r} 132 \\ - 36 \\ \hline 96 \end{array}$
25.  $\begin{array}{r} 196 \\ - 98 \\ \hline 98 \end{array}$

## Take a Holiday!

Count the rectangles below. 8

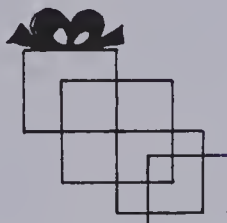


Count the triangles in the star. 10



I may need two vacations!

2. Count the squares below. 11



4. Count the triangles in the tree. 14

91

## Extra Practice

Copy and complete.

- 170 = 17 tens
2. 130 = 13 tens
3. 110 = 11 tens
- 184 = 18 tens 4 ones
5. 156 = 15 tens 6 ones

Subtract.

1.  $\begin{array}{r} 170 \\ - 80 \\ \hline 90 \end{array}$
7.  $\begin{array}{r} 130 \\ - 60 \\ \hline 70 \end{array}$
8.  $\begin{array}{r} 110 \\ - 30 \\ \hline 80 \end{array}$
9.  $\begin{array}{r} 180 \\ - 90 \\ \hline 90 \end{array}$
10.  $\begin{array}{r} 150 \\ - 70 \\ \hline 80 \end{array}$
11.  $\begin{array}{r} 173 \\ - 85 \\ \hline 88 \end{array}$
12.  $\begin{array}{r} 135 \\ - 63 \\ \hline 72 \end{array}$
13.  $\begin{array}{r} 117 \\ - 39 \\ \hline 78 \end{array}$
14.  $\begin{array}{r} 185 \\ - 95 \\ \hline 90 \end{array}$
15.  $\begin{array}{r} 154 \\ - 76 \\ \hline 78 \end{array}$

## Assigning the Practice

Minimum: 1-20

Average: 4-23

Enriched: 6-25

## Reinforcement

1. Prepare this subtraction jigsaw puzzle and have the students cut it out, mix up the pieces, and paste it back together again on construction paper.

143 - 86 57	171 - 99 72	162 - 91 71	85 - 19 66
74	52	29	62
96 170	68 141	66 191	88 211

2. Provide the versatile game board shown below, three markers per player, and a die (cube) with faces numbered from 4 to 9. To start each player places three markers on the board to make 159. In turn, the die is rolled, the number on the die is *subtracted* from the game board number, and the three markers are readjusted. The first player to go below 100 wins.

200	90	9	5	
	80	40	8	4
	70	30	7	3
100	60	20	6	2
	50	10		1
		00		0

## Enrichment

1. Assign *Take a Holiday*, page 91. Encourage the students to devise their own puzzles using closed plane figures.
2. Investigate subtracting with trading in base 5 using quarters, nickels, and pennies and a subtraction grid.

## Objective A20

Find the difference between two numerals requiring regrouping from zero in the minuend.

## Introducing the Lesson

Have the students recall this trading strategy.

135 - 67	13 tens 5 ones - 6 tens 7 ones	12 tens 15 ones - 6 tens 7 ones
-------------	-----------------------------------	------------------------------------

Discuss a similar strategy for minuends of 100 to 109.

105 - 89	10 tens 5 ones - 8 tens 9 ones	9 tens 15 ones - 8 tens 9 ones
-------------	-----------------------------------	-----------------------------------

Record this on the chalkboard as:

$$\begin{array}{r} 9 \ 15 \\ 1 \ 0 \ 5 \\ - \ 8 \ 9 \\ \hline 1 \ 6 \end{array}$$

Have the students try several other subtraction problems with minuends of 100 to 109.

$$108 - 49 \quad 101 - 26 \quad 105 - 37$$

## Teaching the Lesson

From several different pairs of numbers have the students pick the greater number and the lesser number.

Determine which subtraction makes more sense.

27	or	19
-19		-27

greater	or	smaller
-smaller		-greater

For example, if you have 19 candies, can you give 27 candies away?

Cut two lengths of yarn (73 cm and 58 cm). Tape one on top of a metre stick and one below it.

73 cm yarn



58 cm yarn

By counting, demonstrate that the two lengths **differ** by 15 cm. Show that if a 58 cm section were cut from the 73 cm length, 15 cm would remain. The **difference** between two numbers can be found by subtracting.

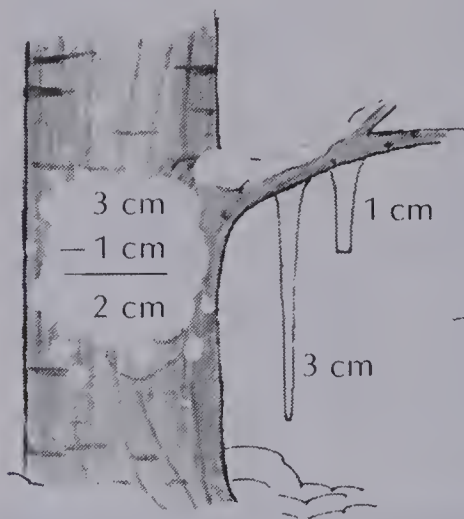
# Differences

Compare two numbers.

Subtracting the smaller number gives the **difference**.

$$62 > 37$$

$$62 - 37 = 25$$



10 =



$$\begin{array}{r} 10 \text{ snowballs} \\ - 7 \text{ snowballs} \\ \hline 3 \text{ snowballs} \end{array}$$

$$\text{greater number} - \text{lesser number} = \text{difference}$$

## EXERCISES

Which is greater?

- 26 or 37
- 42 or 29
- 181 or 90
- 76 or 154

What is the difference between each pair?

- 37 and 26
- 29 and 42
- 90 and 181
- 76 and 154

Copy and complete.

$$\begin{array}{r} 9 \ 16 \\ 106 \\ - 83 \\ \hline 23 \end{array}$$

$$\begin{array}{r} 9 \ 16 \\ 106 \\ - 87 \\ \hline 19 \end{array}$$

$$\begin{array}{r} \blacksquare \ \blacksquare \\ 103 \\ - 25 \\ \hline 78 \end{array}$$

$$\begin{array}{r} \blacksquare \ \blacksquare \\ 105 \\ - 39 \\ \hline 66 \end{array}$$

## Using the Exercises

- Questions 1 to 4 direct the students to find the greater of two numbers.
- Questions 5 to 8 require knowing the meaning of the word *difference* and the placing of the greater numeral in the minuend position before subtracting.
- Questions 9 to 12 involve subtraction from minuends between 100 and 109.



## PRACTICE

Find the difference between each pair.

1. 56 and 78 22
2. 78 and 92 14
3. 92 and 102 10
4. 102 and 95 7
5. 95 and 164 69
6. 164 and 80 84
7. 80 and 131 51
8. 131 and 76 55
9. 76 and 104 28
10. 104 and 88 16
11. 88 and 106 18
12. 106 and 70 36
13. 70 and 95 25
14. 95 and 121 26
15. 121 and 50 71
16. 50 and 103 53
17. 103 and 98 5
18. 98 and 19 79
19. 19 and 53 34
20. 53 and 49 4
21. 49 and 132 83

Solve.

22. 74 blocks for an igloo. Franz has used 36 blocks. How far from done? 38
23. End up with 78 ice cubes. Started with 100. How many were used? 22
24. 93 snowflakes are small. 26 snowflakes are large. How many fewer are large? 67
25. 78 spoons. 167 hot chocolates. How many drinks without spoons? 89

## More about Trading Tens

Trade 1 ten for 10 ones.

2 14  
8 4

1. 

11	17	
1	2	7
2. 

10	18	
1	1	8
3. 

15	16	
1	6	6
4. 

9	17	
1	0	7
5. 

9	18	
1	0	8
6. 

9	10	
1	0	0
7. 

1	9	18
2	0	8
8. 

2	9	16
3	0	6
9. 

3	9	12
4	0	2

93

## Assigning the Practice

Minimum: 1-15, 22-23

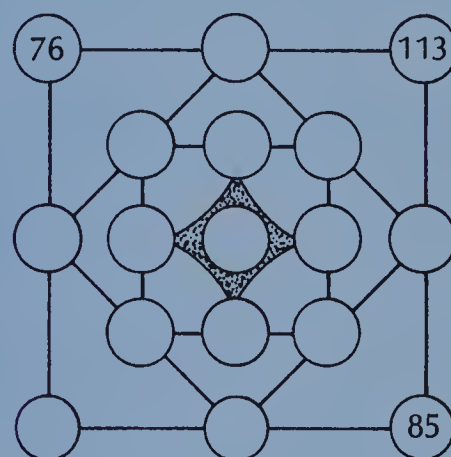
Average: 1-18, 22-25

Enriched: 4-25

## Reinforcement

1. Assign...and More about Trading Tens, page 93. Numbers 7 to 9 involve more than one hundred yet the students should be able to carry their trading strategies over into this situation too.

2. Enlarge the diagram onto a worksheet. Differences are to be recorded in all middle circles until the centre is reached. Zero will be the last difference.



## Enrichment

Play this Snowball game. Provide 20 different subtraction problem cards (so that four sets of five cards can be formed on the basis of common answers) and 3 cotton balls (one less than the number of players).

The object of this game is to acquire a book of any 5 cards with the same answer. After the cards have been mixed and dealt, each player in turn gives the person to the left an unwanted card. The first player to collect a book grabs one of the snowballs (cotton balls) which has been placed in the centre. Each of the other students may then grab for a snowball, also. In the next game the winner becomes the dealer and plays first, and the loser plays last.

a book:

73	105	56	92	39
-45	-77	-28	-64	-11

## Practice

## Worksheet A20

Pages 92-93

the difference between each pair.

1. 103 and 46 57
2. 40 and 120 80
3. 92 and 57 35
4. 64 and 118 54
5. 167 and 76 91
6. 34 and 21 13
7. 108 and 69 39
8. 52 and 103 51
9. 21 and 19 2

plete.

-	105	142	111
89	16	53	22
76	29	66	35

11.	-	92	101	133
	67	25	34	66
	28	64	73	105

12.	-	104	123	102
	45	59	78	57
	78	26	45	24

## Objective A21

Check addition and subtraction problems by doing the inverse operation.

## Introducing the Lesson

Discuss various **opposites**: up-down, forward-backward, hot-cold, right-left. Say a word and ask the students to name its opposite:

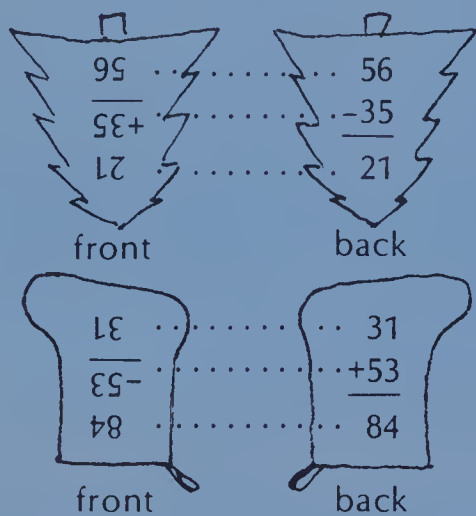
Open...? End...?  
Smile...? Slow...?

## Teaching the Lesson

Explain that we are going to look at some other **opposites**. Show the following on cardboard models.



Flip the tree upside down and then on its back to show how this addition can be **undone**. Do the same to *undo* the subtraction.



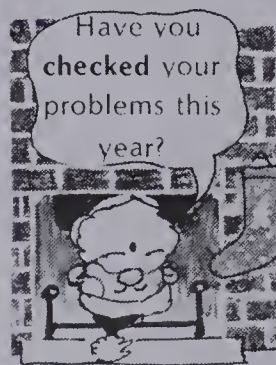
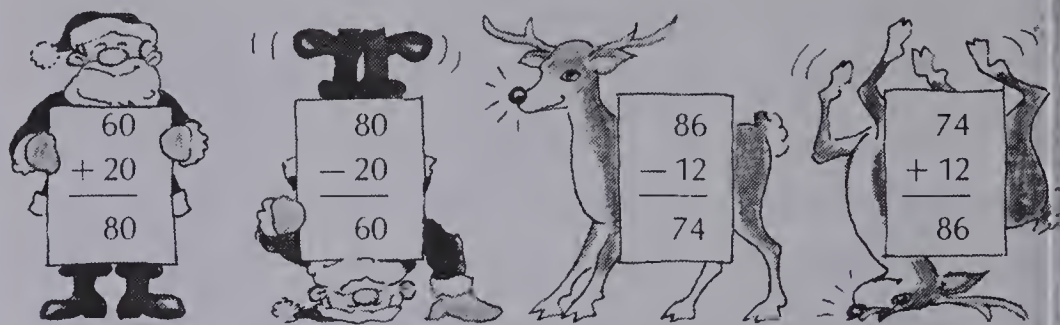
Stress that adding is undone by subtracting and that subtracting is undone by adding. Explain that when we *undo* a problem we also **check** it. Discuss other examples from the top of page 94.

Write several addition or subtraction problems on the chalkboard. Have the students come up and *undo* or *check* them by doing the opposite operation.

1.  $18 \text{ cm} + 47 \text{ cm} = 65 \text{ cm}$
2.  $92 - 87 = 5$
3.  $\$83 - \$26 = \$57$
4.  $19 + 37 = 56$

## Checking Your Work

Adding is undone by subtracting. Subtracting is undone by adding.



1.  $24 + 12 = 36$  (check:  $36 - 12 = 24$  ✓)
2.  $26 + 38 = 64$  (check:  $64 - 38 = 26$  ✓)
3.  $53 - 17 = 44$  (check:  $44 + 17 = 61$  ✓)
4.  $72 - 18 = 54$  (check:  $54 + 18 = 72$  ✓)

## EXERCISES

Undo by subtracting

1.  $50 + 30 = 80$  (check:  $80 - 30 = 50$  ✓)
2.  $56 + 31 = 87$  (check:  $87 - 31 = 56$  ✓)
3.  $35 + 45 = 80$  (check:  $80 - 45 = 35$  ✓)
4.  $89 + 34 = 123$  (check:  $123 - 34 = 89$  ✓)
5.  $47 + 54 = 101$  (check:  $101 - 54 = 47$  ✓)

Undo by adding.

6.  $90 - 40 = 50$  (check:  $50 + 40 = 90$  ✓)
7.  $93 - 46 = 47$  (check:  $47 + 46 = 93$  ✓)
8.  $106 - 19 = 87$  (check:  $87 + 19 = 106$  ✓)
9.  $145 - 92 = 53$  (check:  $53 + 92 = 145$  ✓)
10.  $165 - 87 = 78$  (check:  $78 + 87 = 165$  ✓)

## Using the Exercises

- Questions 1 to 5 require the undoing or checking of an addition.
- Questions 6 to 10 require the undoing or checking of a subtraction.



## PRACTICE

Undo these problems. Correct any wrong answers.

$$\begin{array}{r} 1. \quad 46 \quad 77 \quad 2. \quad 63 \quad 28 \quad 3. \quad 42 \quad 19 \quad 4. \quad 35 \quad 60 \quad 5. \quad 80 \quad 63 \\ +31 \quad -31 \quad -28 \quad +35 \quad -19 \quad +23 \quad +25 \quad -25 \quad -17 \quad +17 \\ \hline 87 \quad 46 \quad 35 \quad 63 \quad 37 \quad 42 \quad 50 \quad 35 \quad 63 \quad 80 \\ 77 \quad \quad \quad 23 \quad \quad \quad 60 \end{array}$$

Do the problems. Check by undoing.

$$\begin{array}{r} 6. \quad 64 \quad 7. \quad 38 \quad 8. \quad 46 \quad 9. \quad 82 \quad 10. \quad 56 \\ +27 \quad +42 \quad +32 \quad -17 \quad -32 \\ \hline 91 \quad 80 \quad 78 \quad 65 \quad 24 \end{array}$$

$$\begin{array}{r} 11. \quad 87 \quad 12. \quad 63 \quad 13. \quad 90 \quad 14. \quad 50 \quad 15. \quad 67 \\ -18 \quad -38 \quad -27 \quad -19 \quad -9 \\ \hline 69 \quad 25 \quad 63 \quad 31 \quad 58 \end{array}$$

$$\begin{array}{r} 16. \quad 56 + 37 \quad 93 \quad 17. \quad 56 - 37 \quad 19 \quad 18. \quad 72 + 18 \quad 90 \\ 19. \quad 72 - 18 \quad 54 \quad 20. \quad 67 - 15 \quad 52 \quad 21. \quad 67 + 15 \quad 82 \\ 22. \quad 115 - 18 \quad 97 \quad 23. \quad 45 + 55 \quad 100 \quad 24. \quad 56 + 82 \quad 138 \end{array}$$

## Undone Table

Copy this table.  
Try to complete it.



+	5	3	9	4	6	8	7
6	11	9	15	10	12	14	13
8	13	11	17	12	14	16	15
5	10	8	14	9	11	13	12
9	14	12	18	13	15	17	16
7	12	10	16	11	13	15	14

95

## Extra Practice

Do the problem. Check by undoing.

$$\begin{array}{r} 28 \quad 75 \quad 1. \quad 53 \quad 90 \quad 2. \quad 80 \quad 36 \quad 3. \quad 73 \quad 25 \quad 4. \quad 102 \quad 23 \\ +47 \quad -47 \quad +37 \quad -37 \quad -36 \quad +44 \quad -25 \quad +48 \quad -23 \quad +79 \\ \hline 75 \quad 28 \quad 90 \quad 53 \quad 44 \quad 80 \quad 48 \quad 73 \quad 79 \quad 102 \end{array}$$

$$\begin{array}{r} 94 + 53 = 147 \\ 147 \\ -53 \\ \hline 94 \end{array} \quad 7. \quad 37 + 58 = 95 \quad 8. \quad 135 - 65 = 70$$

$$\begin{array}{r} 95 \\ -58 \\ \hline 37 \end{array} \quad \begin{array}{r} 70 \\ +65 \\ \hline 135 \end{array}$$

Do these problems. Correct any wrong answers.

$$\begin{array}{r} 39 \quad 114 \quad 10. \quad 123 \quad 64 \quad 11. \quad 105 \quad 78 \quad 12. \quad 78 \quad 175 \quad 13. \quad 106 \quad 38 \\ +75 \quad -75 \quad -64 \quad +59 \quad -78 \quad +27 \quad +97 \quad -97 \quad -38 \quad +68 \\ \hline 104 \quad 39 \quad 59 \quad 123 \quad 37 \quad 105 \quad 175 \quad 78 \quad 78 \quad 106 \\ 114 \quad \quad \quad 27 \quad \quad \quad \quad \quad \quad \quad \quad \quad 68 \end{array}$$

## Assigning the Practice

Minimum: 1-15

Average: 1-24

Enriched: 1-24

## Reinforcement

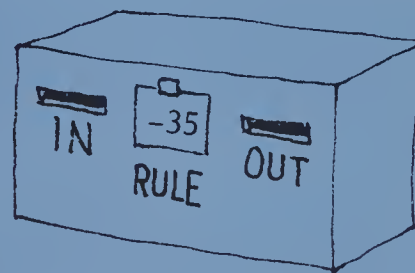
Assign *Undone Table* on Page 95.

Before the children complete the *Undone Table* on their own, demonstrate the solution procedure, which utilizes the undoing process, with this smaller table.

+	6		
	10		
7		14	9
		16	

## Enrichment

Construct a cardboard function computer box. Provide a stack of cards for



input and output. One student goes behind the box and does the computer's work. The other students feed input cards to the computer and check the output cards.

**Activity #1:** Attach a function card (-35) above the *Rule* sign. After a number, say 52, is entered through the input hole, the student behind the box applies the rule (which can be seen on the back of the rule card through a convenient hole), writes the answer on the card, and pushes it through the output slot. Repeat with other input numbers.

**Activity #2:** The human computer picks an addition or subtraction rule. The child in front must determine the rule by feeding the computer input numbers and studying the output numbers. For example, if the input is 38 and the output is 72, then the rule is "add 34" since  $72 - 38 = 34$ .

## Worksheet A21

Pages 94-95

### Objective PS7

Identify key phrases found in addition and subtraction word problems.

### Introducing the Lesson

For each pair of items have the class compose a word problem similar to those on page 96. Record the word problems on the chalkboard.

- |                  |                   |
|------------------|-------------------|
| 27 fir trees     | 81 boots in all   |
| 56 pine trees    | 35 wet boots      |
| 48 hockey sticks | 114 woolen hats   |
| 19 hockey pucks  | 95 woolen scarves |

### Teaching the Lesson

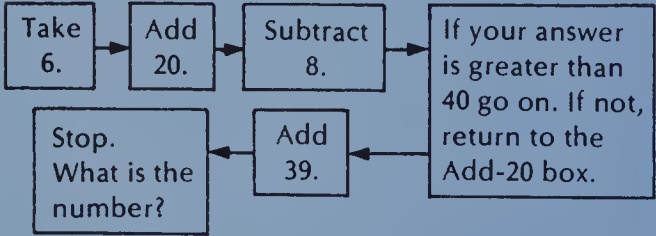
Point out key phrases in the word problems written on the chalkboard.

- How *many more*?
- What is the *total*?
- What is the *difference*?
- How *many altogether*?
- What is the *sum*?
- How *many fewer*?
- How *many in all*?
- How *many are not* ....?

Discuss and decide on the proper operation to answer each question.

### Reinforcement

To prepare the students for *Head to the Back of the Sled*, page 96, do the following example together. Record each step as shown below.



6	26	18	38
+20	- 8	+20	- 8
26	18	38	30

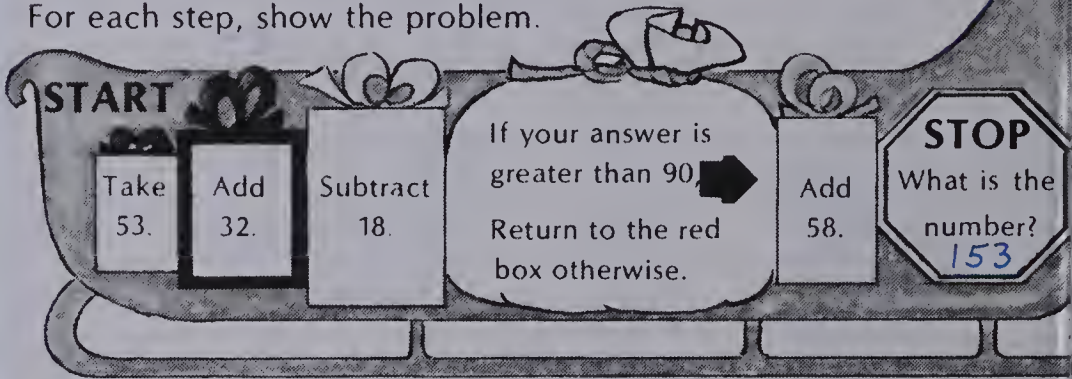
30	50	42	81
+20	- 8	+39	
50	42	81	

## Mixed-up Problems: + and -

- |                      |  |
|----------------------|--|
| 57 kittens           | 1. How many more kittens? <b>20</b>          |
| 37 mittens           | 2. How many in all? <b>94</b>                |
| 28 dry socks         | 3. How many socks? <b>81</b>                 |
| 53 wet socks         | 4. What is the difference? <b>25</b>         |
| 72 kids snowed in    | 5. How many more were in? <b>54</b>          |
| 18 kids snowed on    | 6. How many kids altogether? <b>90</b>       |
| 39 boots here        | 7. How many things somewhere? <b>165</b>     |
| 126 boats there      | 8. How many fewer boots? <b>87</b>           |
| 112 snowballs hit it | 9. How many snowballs altogether? <b>165</b> |
| 47 miss it           | 10. How many more hit than miss? <b>65</b>   |
| 37 cups of cocoa     | 11. How many are not hot? <b>18</b>          |
| 19 of them are hot   | 12. How many cups in all? <b>56</b>          |

### Head to the Back of the Sled!

For each step, show the problem.



96

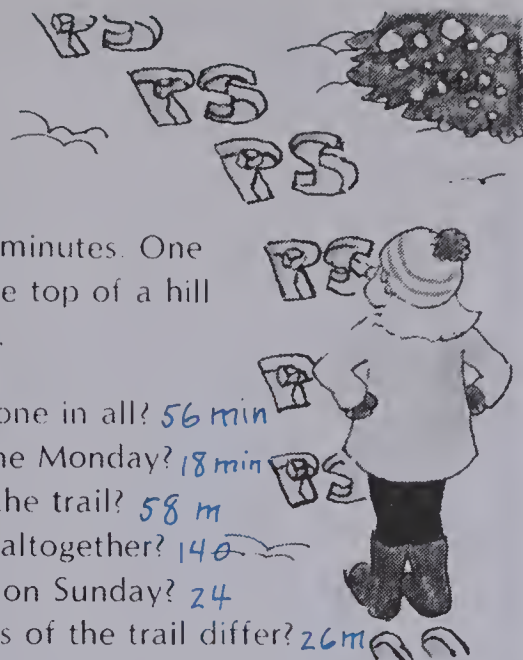
### Problem Solving Activities

Assign Level 3, Unit 5.



# Animal Tracks

Jill follows animal tracks in the snow. She went for 19 minutes on Sunday and saw 58 tracks. Monday she found 82 tracks in 37 minutes. One trail of tracks went 42 metres to the top of a hill and 16 metres down the other side.



- How many minutes was she gone in all? 56 min
- How much longer was she gone Monday? 18 min
- What was the total length of the trail? 58 m
- How many tracks did she see altogether? 140
- How many fewer did she find on Sunday? 24
- By how much do the two parts of the trail differ? 26 m

## REVIEW

Subtract.

A19	1. 126 - 78 48	2. 111 - 23 88	3. 130 - 32 98	4. 174 - 85 89	5. 143 - 49 94
-----	----------------------	----------------------	----------------------	----------------------	----------------------

Find the difference between:

A20	6. 26 and 58 <u>32</u>	7. 62 and 108 <u>46</u>	8. 137 and 53 <u>84</u>
-----	------------------------	-------------------------	-------------------------

Check your answers by undoing.

A21	9. 35 <u>87</u> + 52 <u>-52</u> 87 <u>35</u>	10. 72 <u>131</u> + 59 <u>-59</u> 131 <u>72</u>	11. 63 <u>42</u> - 21 <u>+21</u> 42 <u>63</u>	12. 105 <u>76</u> - 29 <u>+29</u> 76 <u>105</u>	13. 181 <u>89</u> - 92 <u>+92</u> 89 <u>181</u>
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97

## Objective PS8

Organize information from a paragraph for addition and subtraction problems.

## Introducing the Lesson

Copy the paragraph below on an overhead transparency. Read the selection together, noting difficult words.

Wilma hunts for bird tracks in the snow. After looking for 29 minutes on Tuesday, she found 48 tracks. On Wednesday, she located 56 more tracks after only 38 minutes. To find these she walked 95 metres on the first day and 87 metres on the second day.

## Teaching the Lesson

Demonstrate how **summarizing** the information makes it clearer.

Tuesday	Wednesday
29 minutes	38 minutes
48 tracks	56 tracks
95 metres	87 metres

Compose several addition and subtraction questions about the paragraph, using the key phrases stressed on page 96. Record the solutions in detail.

All students may then solve the six questions about the *Animal Tracks* paragraph, page 97. Suggest that they first **summarize** their facts.

## Enrichment

Encourage the students to act out word problems and problem paragraphs. Provide puppets or a chest of play clothes.

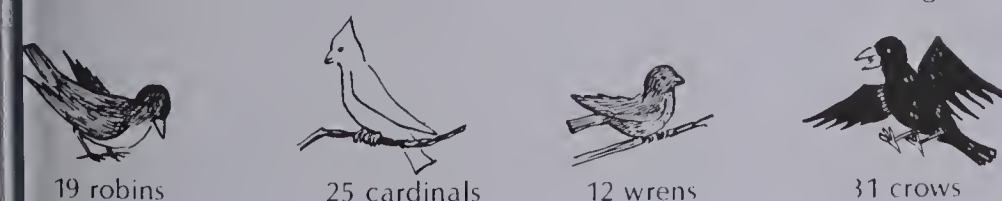
## Review Exercises

Questions	Objective	Pages
1-5	A19	90-91
6-8	A20	92-93
9-13	A21	94-95

## Extra Practice

## Worksheet PS7-PS8

Pages 96-97



19 robins

25 cardinals

12 wrens

31 crows

- How many more cardinals than robins? 6
- How many fewer wrens than crows? 19
- How many robins and wrens? 31
- How many more crows than cardinals? 6
- How many cardinals and wrens? 37
- How many robins and crows? 50

Unit 5 Objective	Test Questions	Pages
A16	1-5	82-83
A17	6-10	84-85
A18	11-15	86-87
A19	16-20	90-91
A20	21-28	92-93
A21	29-32	94-95
PS	33-34	96-97

TEST

UNIT 5

Subtract.

1. 56  
- 23  
33

2. 82  
- 32  
50

3. 75  
- 50  
25

4. 64  
- 61  
3

5. 39  
- 5  
34
6. 65  
- 7  
58

7. 72  
- 3  
69

8. 48  
- 9  
39

9. 53  
- 1  
52

10. 61  
- 6  
55
11. 43  
- 18  
25

12. 82  
- 39  
43

13. 97  
- 63  
34

14. 32  
- 29  
3

15. 71  
- 35  
36
16. 120  
- 40  
80

17. 132  
- 71  
61

18. 139  
- 89  
50

19. 145  
- 78  
67

20. 122  
- 38  
84
21. 150  
- 96  
54

22. 106  
- 34  
72

23. 102  
- 16  
86

24. 105  
- 95  
10

25. 100  
- 37  
63

Find the difference between:

26. 35 and 62 27 27. 183 and 95 88 28. 35 and 102 67

Do the problem. Then check the answer.

29. 43 58  
+ 15 - 43  
58 15

30. 27 102  
+ 75 - 25  
102 27

31. 83 52  
- 52 + 31  
31 83

32. 135 7  
- 78 + 5  
57 13
- 33 candies  
48 cookies

33. How many more cookies? 15

34. How many in all? 81

Post-test

Subtract.

1. 45  
- 25  
20

2. 56  
- 30  
26

3. 78  
- 72  
6

4. 99  
- 23  
76

5. 39  
- 5  
34
6. 34  
- 7  
27

7. 23  
- 9  
14

8. 95  
- 8  
87

9. 73  
- 5  
68

10. 61  
- 6  
55
11. 86  
- 28  
58

12. 63  
- 54  
9

13. 75  
- 25  
50

14. 32  
- 17  
15

15. 71  
- 35  
36
16. 150  
- 80  
70

17. 165  
- 74  
91

18. 111  
- 48  
63

19. 173  
- 95  
78

20. 122  
- 38  
84

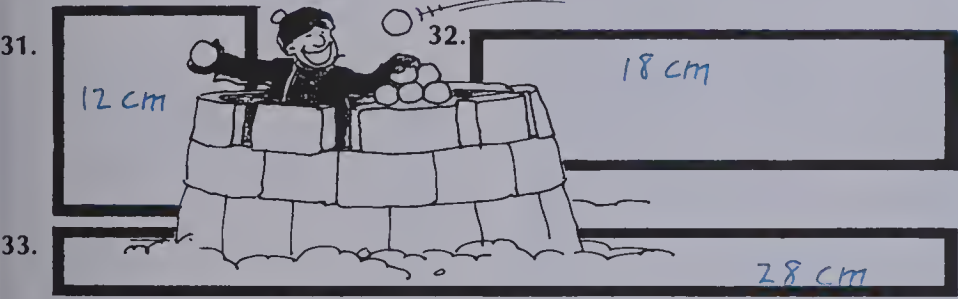


## ADDITION

Add.

- |  |  |  |   |  |
|--|--|--|---|--|
| 1. $\begin{array}{r} 5 \\ +7 \\ \hline 12 \end{array}$       | 2. $\begin{array}{r} 3 \\ +8 \\ \hline 11 \end{array}$       | 3. $\begin{array}{r} 9 \\ +7 \\ \hline 16 \end{array}$           | 4. $\begin{array}{r} 8 \\ +6 \\ \hline 14 \end{array}$            | 5. $\begin{array}{r} 9 \\ +0 \\ \hline 9 \end{array}$                  |
| 6. $\begin{array}{r} 60 \\ +2 \\ \hline 62 \end{array}$      | 7. $\begin{array}{r} 10 \\ +7 \\ \hline 17 \end{array}$      | 8. $\begin{array}{r} 35 \\ +8 \\ \hline 43 \end{array}$          | 9. $\begin{array}{r} 73 \\ +9 \\ \hline 82 \end{array}$           | 10. $\begin{array}{r} 65 \\ +4 \\ \hline 69 \end{array}$               |
| 11. $\begin{array}{r} 38 \\ +47 \\ \hline 85 \end{array}$    | 12. $\begin{array}{r} 62 \\ +28 \\ \hline 90 \end{array}$    | 13. $\begin{array}{r} 88 \\ +9 \\ \hline 97 \end{array}$         | 14. $\begin{array}{r} 36 \\ +53 \\ \hline 89 \end{array}$         | 15. $\begin{array}{r} 27 \\ +66 \\ \hline 93 \end{array}$              |
| 16. $\begin{array}{r} 74 \\ +74 \\ \hline 148 \end{array}$   | 17. $\begin{array}{r} 96 \\ +63 \\ \hline 159 \end{array}$   | 18. $\begin{array}{r} 38 \\ +61 \\ \hline 99 \end{array}$        | 19. $\begin{array}{r} 74 \\ +50 \\ \hline 124 \end{array}$        | 20. $\begin{array}{r} 76 \\ +43 \\ \hline 119 \end{array}$             |
| 21. $\begin{array}{r} 48 \\ +59 \\ \hline 107 \end{array}$   | 22. $\begin{array}{r} 86 \\ +96 \\ \hline 182 \end{array}$   | 23. $\begin{array}{r} 35 \\ +85 \\ \hline 120 \end{array}$       | 24. $\begin{array}{r} 94 \\ +9 \\ \hline 103 \end{array}$         | 25. $\begin{array}{r} 97 \\ +97 \\ \hline 194 \end{array}$             |
| 26. $\begin{array}{r} 4 \\ 8 \\ +3 \\ \hline 15 \end{array}$ | 27. $\begin{array}{r} 7 \\ 7 \\ +7 \\ \hline 21 \end{array}$ | 28. $\begin{array}{r} 70 \\ 50 \\ +80 \\ \hline 200 \end{array}$ | 29. $\begin{array}{r} 6 \\ 5 \\ 7 \\ +9 \\ \hline 27 \end{array}$ | 30. $\begin{array}{r} 40 \\ 50 \\ 20 \\ +90 \\ \hline 200 \end{array}$ |

Find the perimeter of each rectangle.



- |  |   |   |   |   |
|--|---|---|---|---|
| 140  | 22. 103   | 23. 107   | 24. 100   | 25. 100   |
| $\begin{array}{r} 65 \\ -75 \\ \hline \end{array}$ | $\begin{array}{r} -28 \\ \hline 75 \end{array}$ | $\begin{array}{r} -42 \\ \hline 65 \end{array}$ | $\begin{array}{r} -56 \\ \hline 44 \end{array}$ | $\begin{array}{r} -27 \\ \hline 73 \end{array}$ |

the difference between:

- |                    |                          |                          |
|--------------------|--------------------------|--------------------------|
| 6 and 73 <b>27</b> | 27. 137 and 61 <b>76</b> | 28. 39 and 104 <b>65</b> |
|--------------------|--------------------------|--------------------------|

the problem. Then check the answer.

- |   |   |   |   |
|---|---|---|---|
| 35. $\begin{array}{r} 79 \\ -44 \\ \hline 35 \end{array}$ | 30. $\begin{array}{r} 48 \\ +72 \\ \hline 120 \end{array}$ $\begin{array}{r} 120 \\ -72 \\ \hline 48 \end{array}$ | 31. $\begin{array}{r} 84 \\ -27 \\ \hline 57 \end{array}$ $\begin{array}{r} 57 \\ +27 \\ \hline 84 \end{array}$ | 32. $\begin{array}{r} 117 \\ -65 \\ \hline 52 \end{array}$ $\begin{array}{r} 65 \\ +52 \\ \hline 117 \end{array}$ |
|---|---|---|---|

42 cup cakes

23 candy bars

33. How many sweets in all? **65**

34. How many fewer candy bars than cup cakes?

**19**

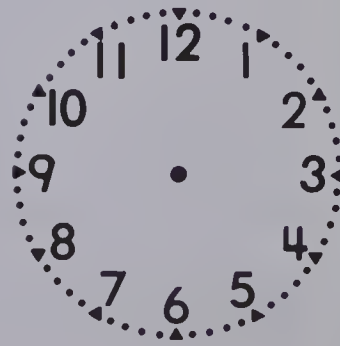
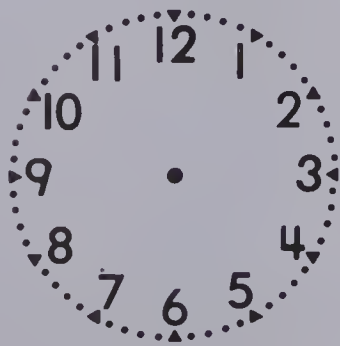
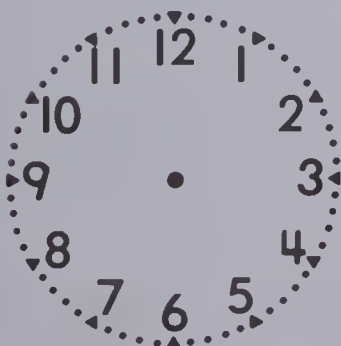
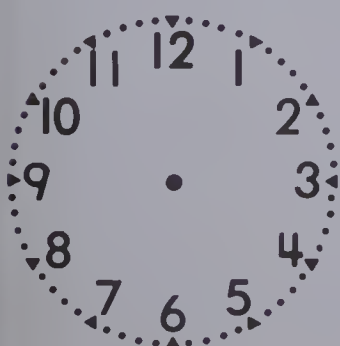
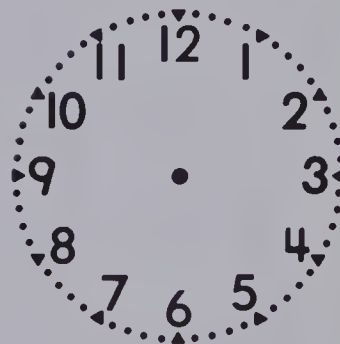
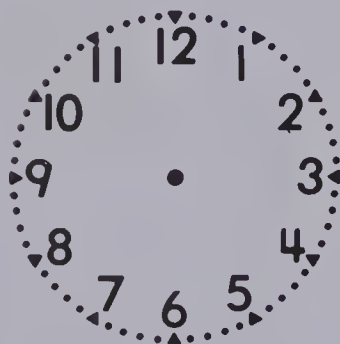
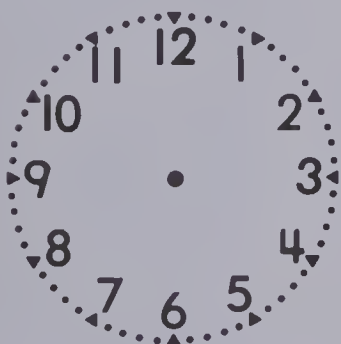
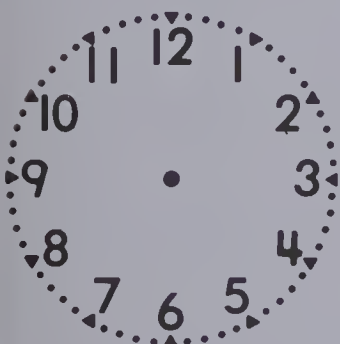
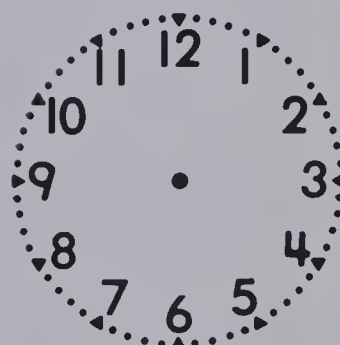
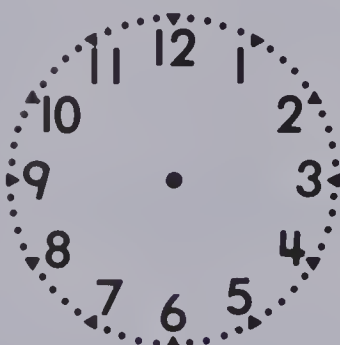
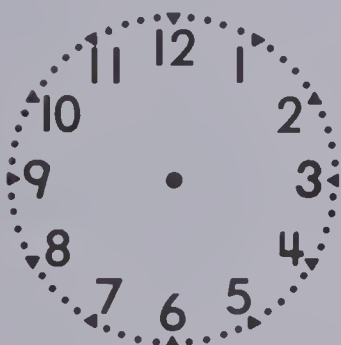
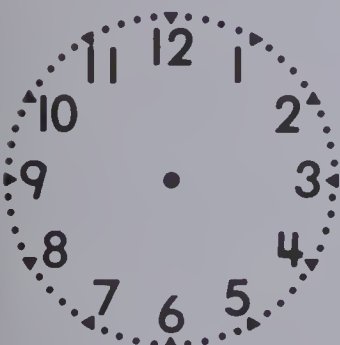
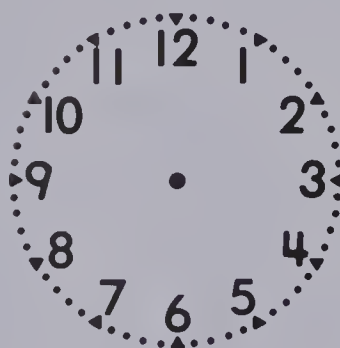
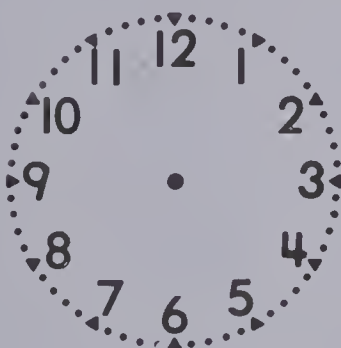
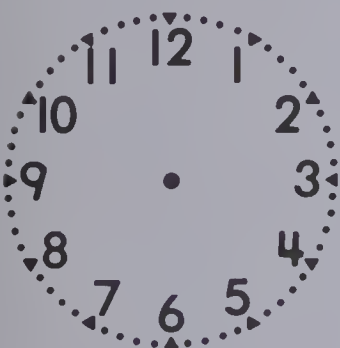
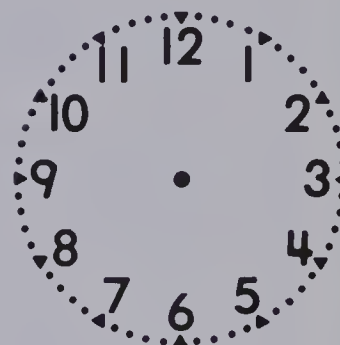
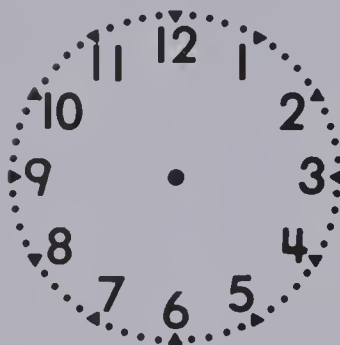
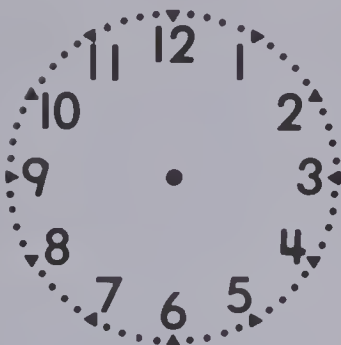
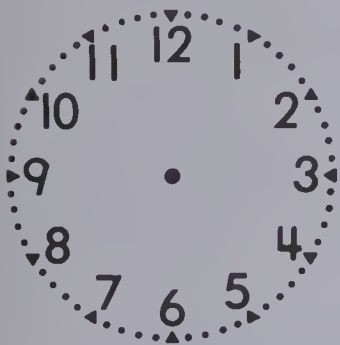
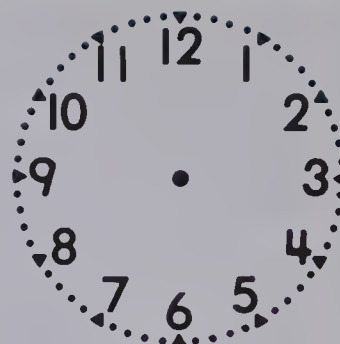
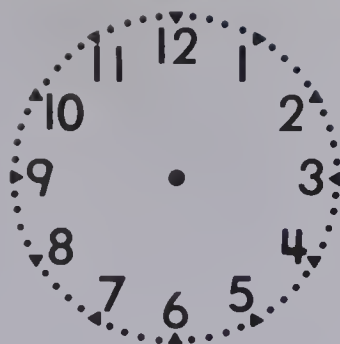
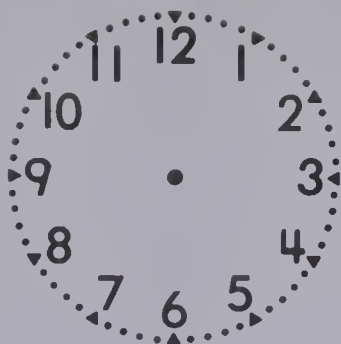
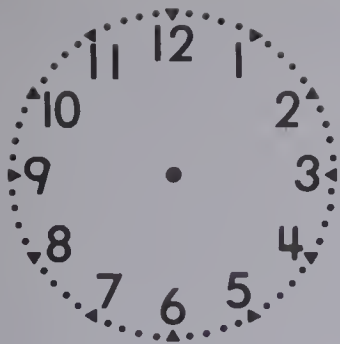
# UNIT 6

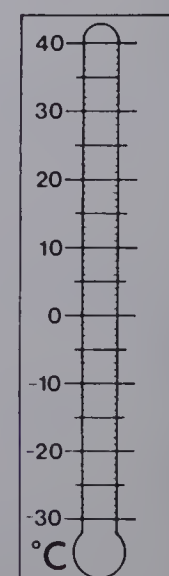
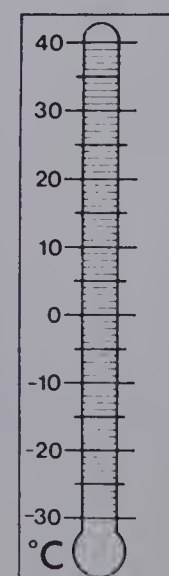
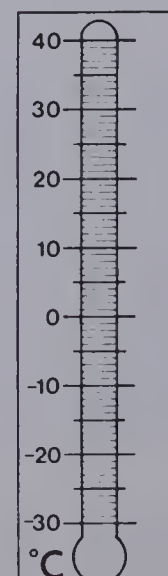
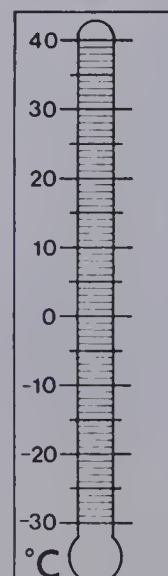
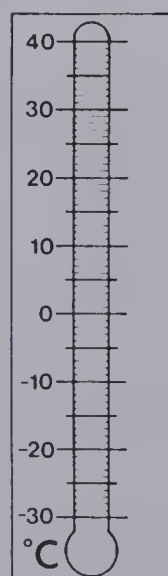
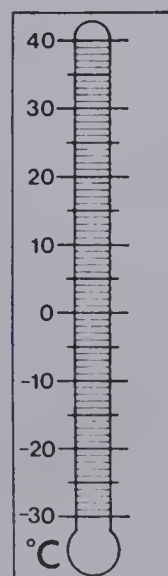
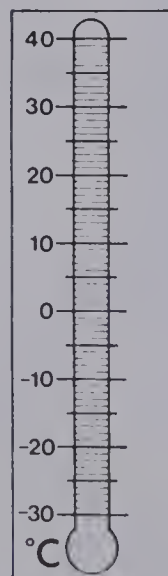
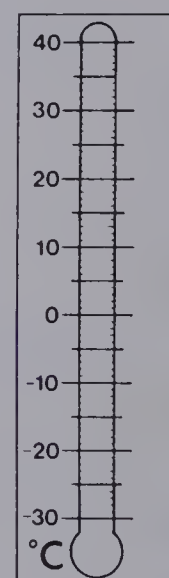
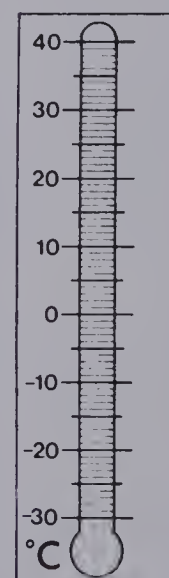
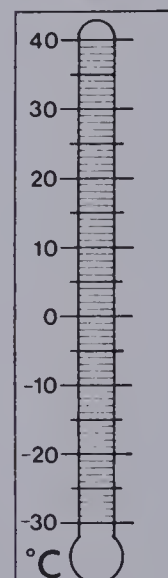
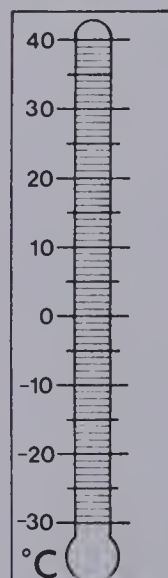
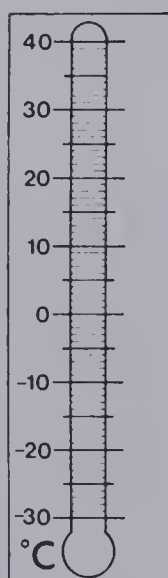
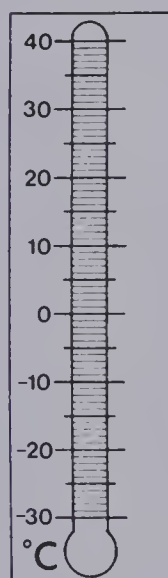
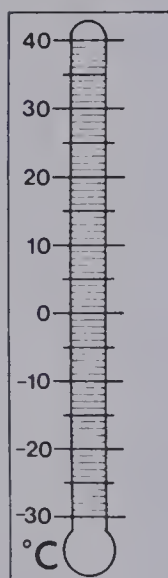
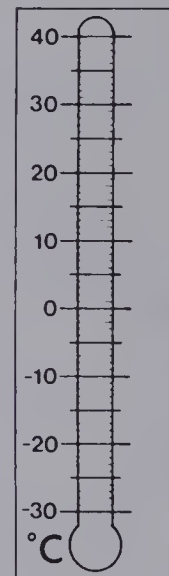
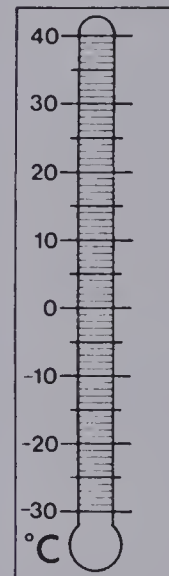
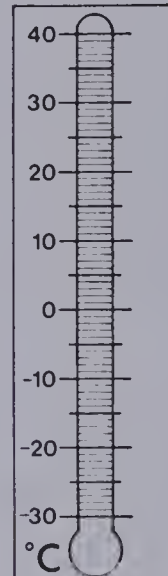
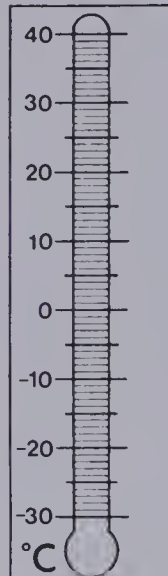
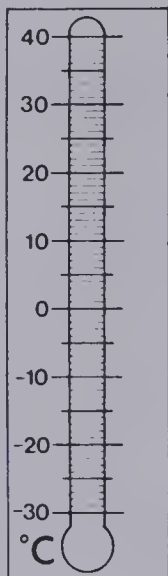
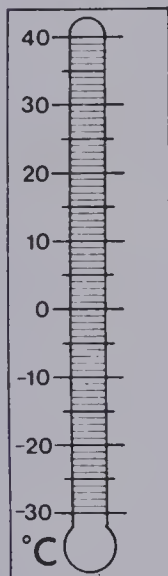
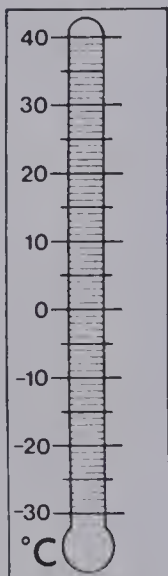
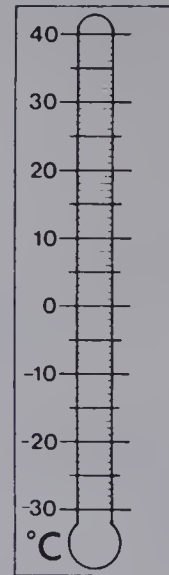
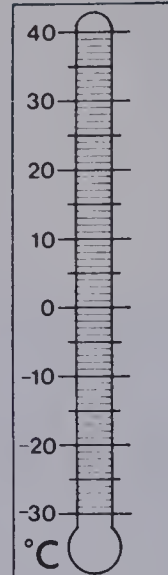
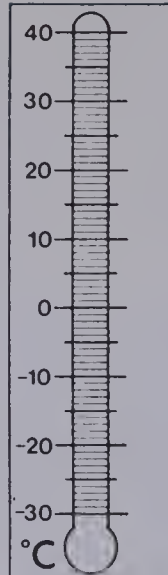
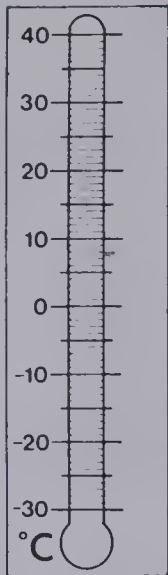
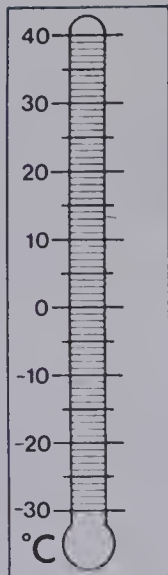
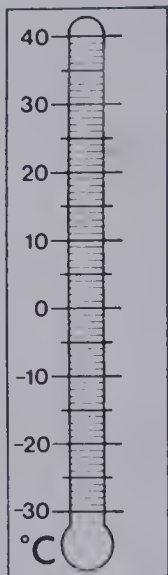
## Measurement

Theme: Living Things

Lesson		Objective	Vocabulary	Materials
Preview		Estimate and measure in centimetres.	height, width, perimeter	centimetre rulers, metre sticks
1	M8	Choose gram or kilogram as appropriate units.	mass, lighter, heavier, gram, kilogram	1 g masses, 10 kg masses, pan balances, objects
2	M9	Estimate and measure mass.	pan balance, scales	mass sets (1 g, 10 g, 100 g, 1 kg), pan balances, mass demonstration cards
3	GR1	Interpret and construct bar graphs.	bar graphs, tally	graph paper, coloured stickers
4	M10	Estimate temperature and read a Celsius thermometer to one-degree intervals.	temperature, Celsius	thermometer chart, thermometers
5	M11	Tell time to five-minute intervals.	hour dial, minute dial, hour hand, minute hand	demonstration hour dial and minute dial, clocks, set of clock models
6	M12	Tell time to one-minute intervals for dial and digital clocks.	past, digital clocks	
7	PS9	Compare measurements involving time, length, and mass.	compare, later, longer	measurement review chart
	PS10	Use a concrete model to solve addition problems involving time.	model	set of clock models
8	M13	Read and write dates and order days, months, years, and seasons.	date, season, month, year	calendars
Test		Measurement		
Review		Two-digit subtraction		









# About This Unit

Measurement concepts and skills cannot be learned strictly from text materials. Such learning requires concrete experience with common measurement instruments such as metre sticks, pan balances, Celsius thermometers, dial and digital clocks, and calendars. Estimation practice is vitally important.

Unit 6 deals with the topics of length, mass, temperature, bar graphs, and time. Other measurement topics are integrated with underlying math concepts in Units 1 to 4, 9, 12, 14, and 15. Unit 6 may be a useful resource for the teacher in two ways.

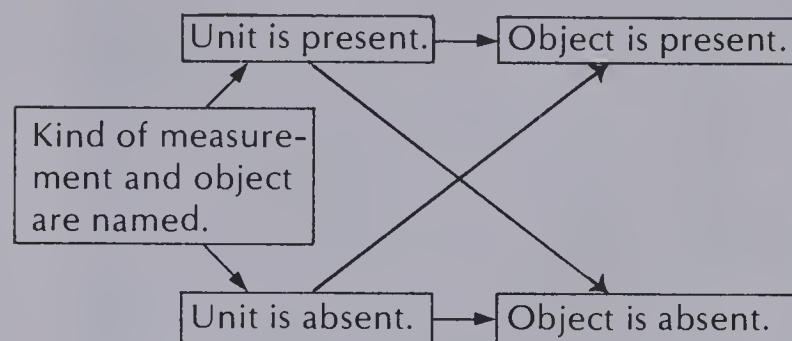
1. The notes suggest practical measurement experience and concrete activities which may serve as the essential ingredient of instruction.
2. The student text provides further practice with:
  - estimation and reasonableness (Lessons 1, 2, 5, 6)
  - actual and simulated measurement (Lessons 2, 4, 5, 6)
  - mathematical integration (Lessons 1, 2, 3, 7, 8)
  - applications and problem solving (Lessons 1-8).

The textbook contains several unique features.

1. Use of the activity centre activities in the notes may precede or follow the assignment of textbook exercises, depending upon the teacher's inclination.
2. Measurement of mass using pan balances employs *place value mass sets* (1 g, 10 g, 100 g, 1 kg) to avoid complicated computation with 3-digit numbers.
3. The dial clock is viewed as a combination of two dials: an explicit hour dial and an implicit minute dial.
4. Two common conventions for dates are introduced, the traditional one (May 1, 1990) and the descending one (90-5-1).

Metric estimation is a crucial skill. For many situations it is more useful than a theoretical understanding of the structure of the metric system. Ideally, the presentation of the relationships of common units (length: centimetre, metre, and kilometre) should include elements of both approaches. It is most likely that estimation skills are best achieved by having stu-

dents first make an estimate and then use measurement as a check. The paths below represent four useful modes of estimation.



To complete the activities and exercises in Unit 6 takes at least three weeks. Arithmetic practice should occur during this period. The subject of measurement provides excellent opportunities for application and problem solving involving two-digit addition and subtraction and for review of place-value concepts.

## Ideas

The integrative theme of Unit is *Living Things*. The descriptions and comparisons require measurements involving length, mass, temperature, and time. Enlist your librarian's services in establishing a book, picture, and filmstrip centre related to the subject of this unit. Excellent teacher references include:

*Animal World Encyclopedia*, Hamlyn Publishing, Toronto, 1972.

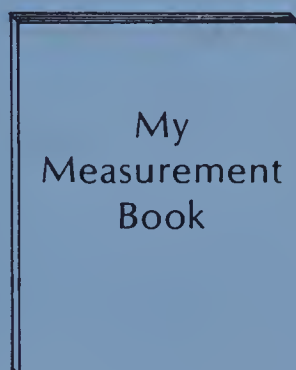
*Comparisons*, Diagram Group, New York, 1980. (This excellent resource requires conversion from Imperial units to metric.)

Activity work cards for measurement stations or centres are presented in the notes for each lesson. Such essential activities may either precede or follow textbook assignments. It cannot be stressed enough that successful individual and small group work requires careful planning, execution, and experimentation with materials, sequencing, classroom management, and follow-up work.

Here are some helpful hints to get you started.

1. Include a variety of measurement experiences:
  - everyday applications (grocery measurement, school schedules)
  - estimation before measurement
  - integration with other subjects and math topics
  - practice with measuring instruments

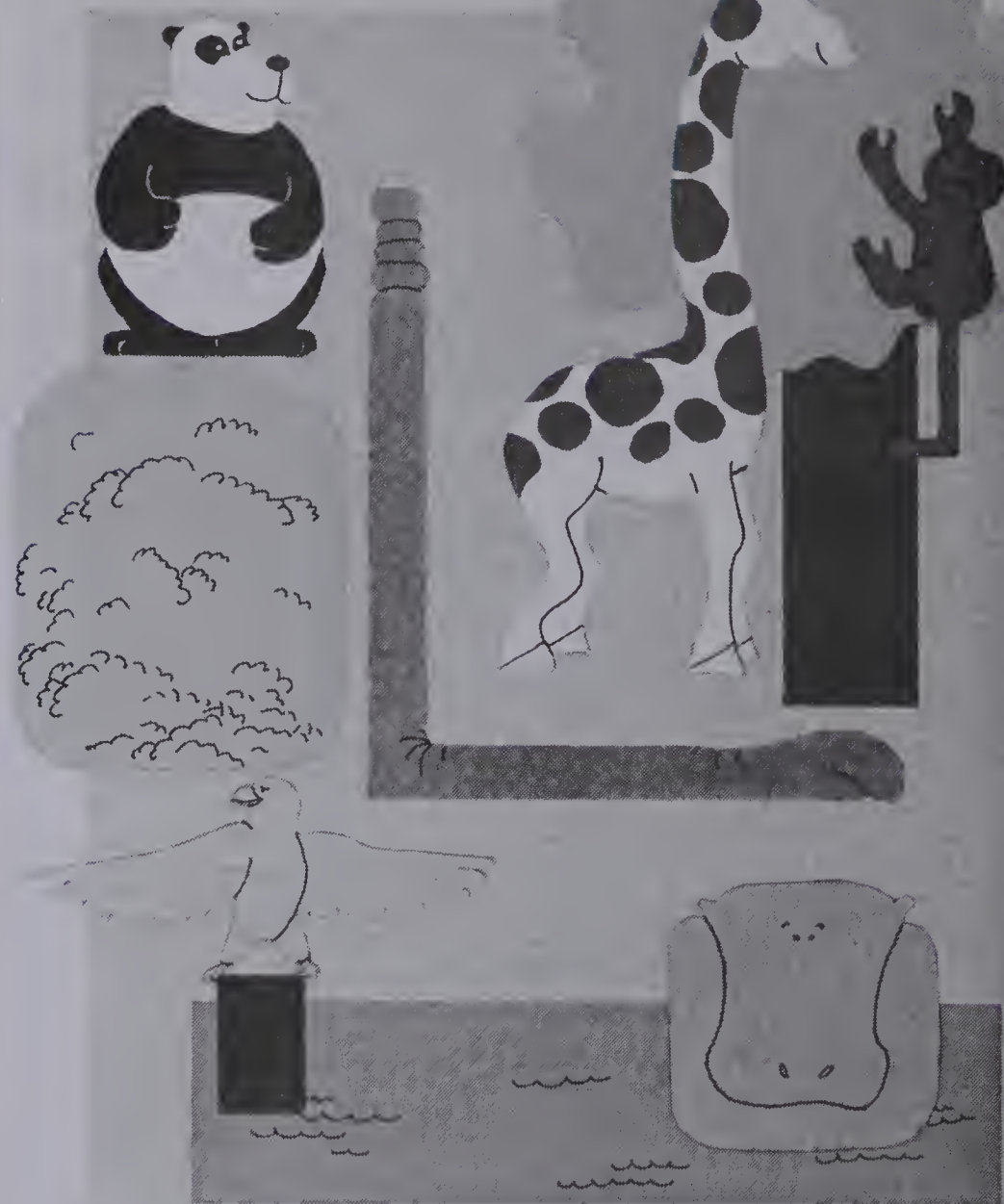
2. Prepare a developmental sequence of activities which proceed from simple, concrete experiences to more open-ended activities involving experimentation and problem solving.
3. Preview your materials and work cards with the students. Rewrite directions on work cards so that they are most appropriate for your students. Employ a buddy system, pairing students to reduce the number of questions.
4. Manage the activity by either assigning students to tasks or having students select tasks from a "choosing board". Clearly define the procedure for switching between tasks.
5. Require the students to keep a measurement record notebook. Establish and maintain criteria for student record-keeping. Devise a chart to monitor completed tasks.



Unit 6 Objective	Test Questions	Pages
M8	1-4	102-103
M9	5-8	104-105
M10	9-11	108-109
M11	12-14	110-111
M12	15-17	112-113
M13	18-20	116-117

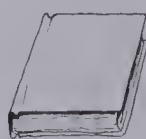
## UNIT 6

### MEASUREMENT



#### Pretest

Pick the mass and length



1. 23 cm or 23 km

2. 1 g or 1 kg



3. 1 m or 1 cm

4. 40 kg or 40 g

Find the total mass.

5. 1023 g

6. 2102 g

7. 8 9 8090 g

8. 3 4 6 346 g

Write the temperature

9. 10 C 5°

10. 20 C 11°

11. 30 C 26°



# The Metric Zoo

Donna's sister made a collage using paper cutouts.  
Use your centimetre ruler to measure the plants and animals.

Find the **height**.

1. the panda 5 cm
2. the eagle's pole 2 cm
3. the bush 6 cm
4. the tree 13 cm
5. the hippopotamus 4 cm
6. the giraffe 11 cm

Find the **width**.

7. the bush 5 cm
8. the wading pool 12 cm
9. the hippopotamus 4 cm
10. the tree trunk 2 cm
11. the eagle's wings 7 cm
12. the purple rectangle 14 cm

Find the **length**.

13. the snake 16 cm
14. the monkey's tail 3 cm
15. the purple rectangle 18 cm

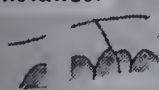
Find the **perimeter**.

16. the eagle's pole 7 cm
17. the wading pool 30 cm
18. the purple rectangle 64 cm

Complete each equation.

19.  $5 \text{ km} = \text{■} \text{ m}$  5000
20.  $\text{■} \text{ km} = 7000 \text{ m}$  7
21.  $8 \text{ m} = \text{■} \text{ cm}$  800
22.  $\text{■} \text{ m} = 300 \text{ cm}$  3
23.  $2 \text{ m} = \text{■} \text{ cm}$  200
24.  $\text{■} \text{ m} = 900 \text{ cm}$  9
25.  $4 \text{ m} + 3 \text{ dm} + 8 \text{ cm} = \text{■} \text{ cm}$  438
26.  $9 \text{ m} + 6 \text{ dm} + 0 \text{ cm} = \text{■} \text{ cm}$  960
27.  $2 \text{ m} + 7 \text{ dm} + 0 \text{ cm} = \text{■} \text{ cm}$  270
28.  $7 \text{ m} + 0 \text{ dm} + 6 \text{ cm} = \text{■} \text{ cm}$  706
29.  $7 \text{ m} + 2 \text{ cm} = \text{■} \text{ cm}$  702
30.  $1 \text{ m} + 3 \text{ cm} = \text{■} \text{ cm}$  103

**BEWARE!**  
Max will eat  
our mistakes.



101

## UNIT 6 PREVIEW

### Suggestions

Use objects in the classroom to distinguish between *height*, *width*, *length*, and *perimeter*. Note that these terms, at times, relate to the same dimension (height and length of a person). Practise estimating the measurements in centimetres before measuring with a centimetre ruler and metre stick.

Recall the relationships among centimetres, decimetres, metres, and kilometres. Review exercises similar to those at the bottom of page 101.

### About the Page

Read the directions for *Metric Zoo* on page 101. Associate the animal vocabulary with the illustrations on page 100.

### Reinforcement

#### Length 1

Measure parts of your body using a metre stick and a string.

length		ankle	nose
around		foot	finger
width		neck	waist

*Hint:* Replace vocabulary with pictures to reduce the students' reading load.

Prepare cardboard models of 10 different animals, each with curved tails. If necessary, refer an artistic parent or teacher's aide to your animal reference books.

#### Length 2

##### Tail Game

Each player guesses the length of a tail. Then use string to help you measure the tail. The closest player wins the animal. The first player with 3 animals wins.

### Enrichment

On strips of masking tape show the height of 5 large animals on the wall. Clearly label each tape.

#### Length 3

First, estimate the animal's height. Then, check by measuring.

Example: horse 2 m 1 m and 60 cm

What is the time?

2. 12:30
13. 6:45
14. 9:10
5. 3:37
16. 8:08
17. 9:52

Write the date another way

8. February 29, 1984 84-2-29
9. 88-3-5 March 5, 1988
0. 1945-11-10 November 10, 1945

## Objective M8

Choose gram or kilogram as appropriate units.

## Introducing the Lesson

Pass around a 1 g mass and a 1 kg mass. Explain how each is a unit for measuring mass. Have the students suggest objects in the classroom for which each unit would be appropriate.

Grams: pencil, penny, scissors.

Kilograms: clock, dictionary, chair.

## Teaching the Lesson

Let the students guess how many grams it takes to make one kilogram. Display the equation.

$$1000 \text{ g} = 1 \text{ kg}$$

Have the students recall the equation

$$1000 \text{ m} = 1 \text{ km}$$

developed in Unit 4. Practise several equations similar to those on page 103.

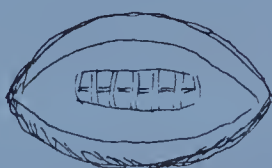
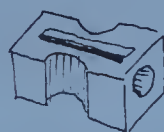
Read page 102 together. Use a pan balance, a 1 kg mass, and a variety of objects to review the verbal descriptions involving *lighter*, *heavier*, and *balanced*.

Have the students suggest common objects which have a mass of 1 g, 5 g, and 1 kg.

nail

sharpener

football



# Choosing the Units

The **gram** and **kilogram** are units of mass.

One thousand grams equals one kilogram.

$$1000 \text{ g} = 1 \text{ kg}$$



The hamster and 1 kg are **balanced**.  
The hamster **has a mass** of 1 kg.



The sparrow is **lighter** than 1 kg.  
One kilogram is **heavier** than the sparrow.

Each has a mass of about 1 g.




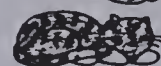



Each has a mass of about 5 g.



## EXERCISES

Choose the better answer.

1. A small rabbit  1 g or 1 kg
2. A tack  1 g or 1 kg
3. An earthworm  7 g or 7 kg
4. A cat  3 g or 3 kg
5. A dime  2 g or 2 kg

## Using the Exercises

- Questions 1 and 2 involve choosing appropriate units of 1 g or 1 kg.
- Questions 3 to 5 involve choosing appropriate units for masses less than 10 units.



## PRACTICE

Complete each equation.

1.  $1 \text{ kg} = \overset{1000}{\blacksquare} \text{ g}$

2.  $6 \text{ kg} = \overset{6000}{\blacksquare} \text{ g}$

3.  $\overset{3}{\blacksquare} \text{ kg} = 3000 \text{ g}$

4.  $\overset{8}{\blacksquare} \text{ kg} = 8000 \text{ g}$

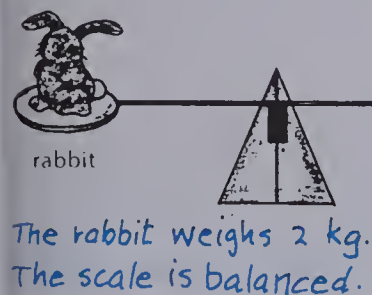
Choose the more **reasonable** mass and length.

	Mass	Length
a sheepdog	5. 20 g or <u>20 kg</u>	6. 1 cm or <u>1 m</u>
a snake	7. 1 g or <u>1 kg</u>	8. 1 cm or <u>1 m</u>
a spider	9. <u>4 g</u> or 4 kg	10. <u>5 cm</u> or 5 m
a squash	11. 1 g or <u>1 kg</u>	12. 20 km or <u>20 cm</u>
a tricycle	13. 10 g or <u>10 kg</u>	14. 1 km or <u>1 m</u>
an eraser	15. <u>10 g</u> or 10 kg	16. <u>5 cm</u> or 5 dm
a telephone	17. 3 g or <u>3 kg</u>	18. <u>2 dm</u> or 2 km
telephone wires	19. <u>1 kg</u> or 1000 kg	20. <u>5 dm</u> or 5 km

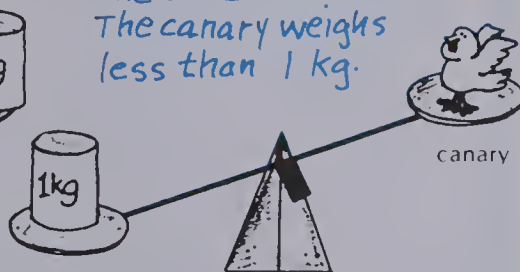
## Mass Messages

Write two sentences to describe each picture.

1.



2. *The scale is not balanced.  
The canary weighs less than 1 kg.*



103

## Extra Practice

List 5 objects for each.

- mass less than 1 kg
- mass between 2 kg and 5 kg
- mass close to 5 kg
- mass less than 5 g
- mass between 5 g and 10 g
- mass close to 10 g

*Answers will vary.*

## Worksheet M8

Pages 102-103

## Assigning the Practice

Minimum: 1-18

Average: 1-20

Enriched: 1-20

## Reinforcement

1. Assign *Mass Messages* on page 103.

2. Fill 10 baby food jars with natural items: dirt, grass, sand, air, seeds, water, etc. Label each jar.

### Mass 1

Feel the mass of each jar.  
List the jars from heaviest to lightest.  
Use a pan balance to help you.

## Enrichment

1.

### Mass 2

Match each animal card with a mass.  
Record your answers.  
Check the answers with the library books at this station.

Some possible examples are:

moose

450 kg

hippo

3800 kg

Prepare questions that can be checked.

2. Have students compare the mass of 50 g of unpopped corn to the mass of the corn after popping. Discuss the reason for the difference.

3. Investigate the mass of air. (Try a vacuum-packed food stuff; remove the air from a plastic covered can; blow up a balloon; etc.)

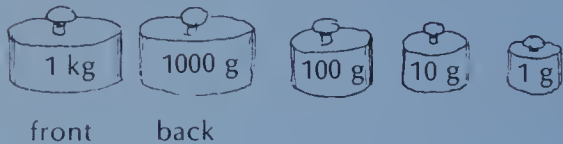
## LESSON 2

## Objective M9

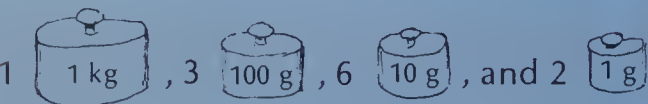
## Estimate and measure mass.

## Introducing the Lesson

Show a set of cardboard *mass demonstration cards* consisting of ten 1 g, ten 10 g, ten 100 g, and nine 1 kg (1000 g).



Have the students recall that 1 kg equals 1000 g. Use the place-value techniques of Unit 3 to demonstrate how



equals 1362 g.

## Teaching the Lesson

Discuss the presentation and exercises on page 104. Using the *mass demonstration cards*, illustrate the following masses.

1347 g	2060 g
350 g	1408 g
4600 g	705 g

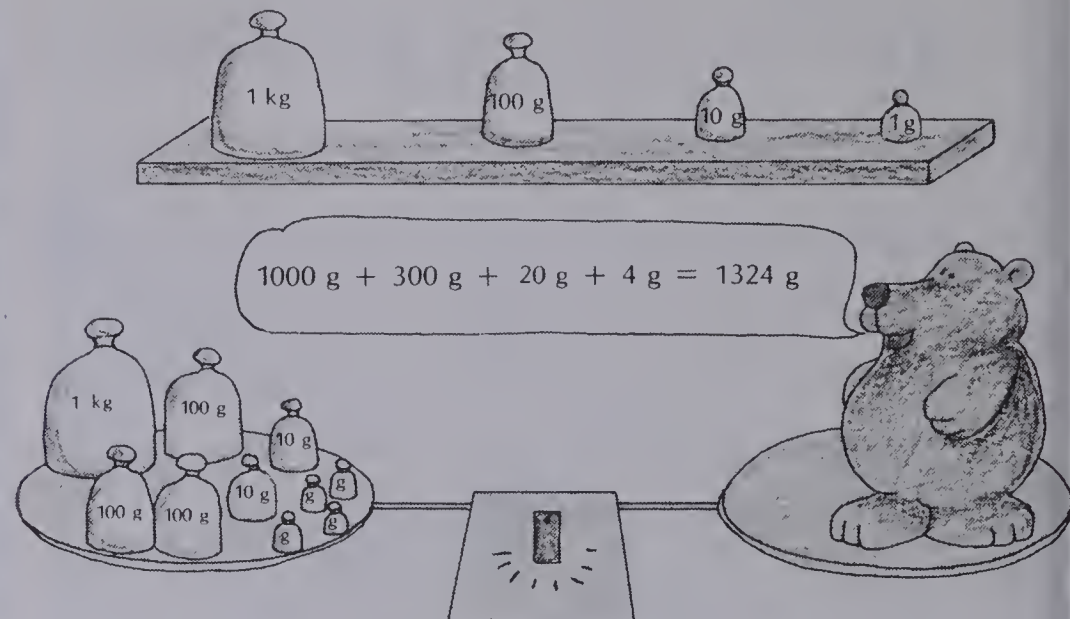
Pass around a 1 kg mass. Then challenge the students to estimate in kilograms the mass of several objects between 1 kg and 10 kg. Keep a list of the estimates on the chalkboard.

Check the mass of each object above using a restricted mass set consisting of 1 g, 10 g, 100 g, and 1 kg masses. (A set is easily constructed from common mass sets with masking tape.) Follow a similar procedure as performed with the *mass demonstration cards* to determine mass totals.

Each student should have the opportunity to use a pan balance and the 1 g, 10 g, 100 g, and 1 kg masses to check each estimate.

# A Way to Measure Mass

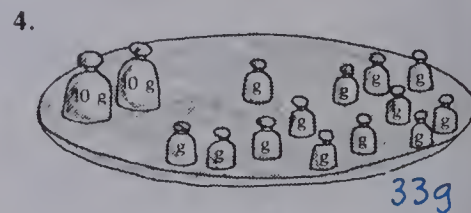
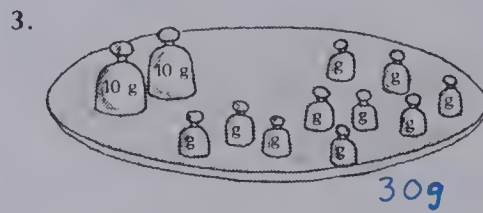
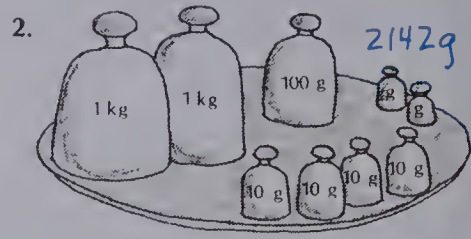
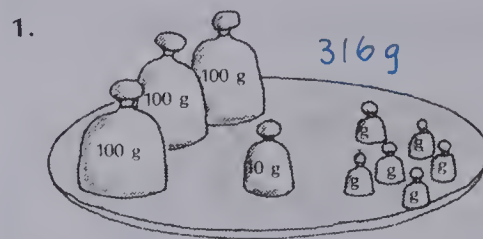
A **pan balance** can be used with these masses



The clay bear has a mass of 1324 g.

## EXERCISES

Find each total mass.



## Using the Exercises

- Questions 1 to 4 have the student determine total masses using restricted mass sets (1 g, 10 g, 100 g, 1 kg).



## PRACTICE

Find the total mass.

1. 3 , 5 , 3 , 8 3538g
2. 5 , 8 , 0 , 2 5802g
3. 1 , 2 , 0 , 4 4210g
4. 2 , 1 , 4 , 6 2641g
5. 3 , 5 , 9 , 7 5379g
6. 2 , 0 , 3 , 5 3052g
7. 6 , 2 , 7 6027g
8. 6 , 4 , 2 2604g
9. 1 , 2 , 15 135g
10. 2 , 10 , 0 300g

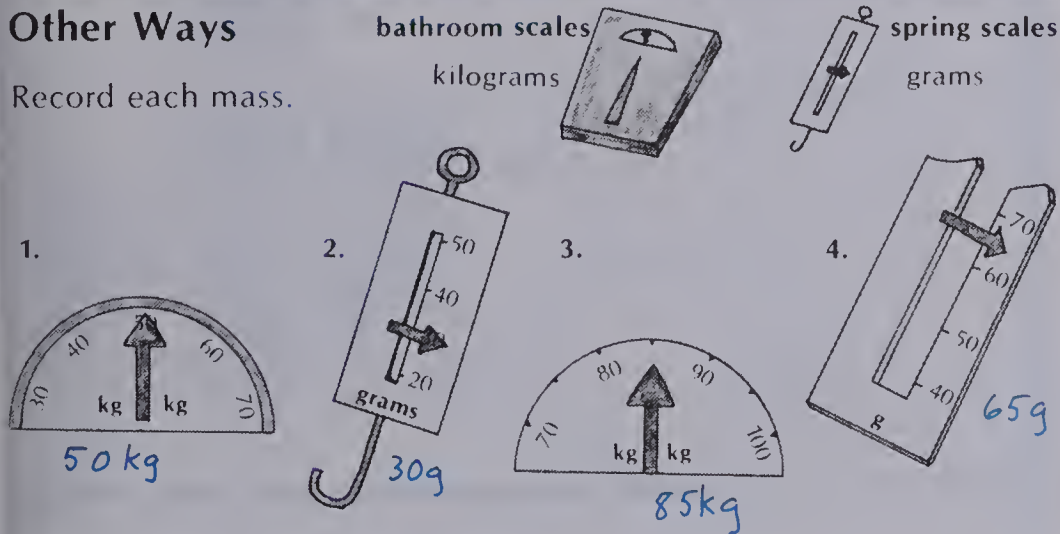
11. Copy and complete the table. Use a pan balance.

	I estimate about					TOTAL (g)
shoe	■ kg					
jar	■ kg					
rock	■ g					
ball	■ g					

Answers may vary.

## Other Ways

Record each mass.



105

## Assigning the Practice

Minimum: 1-10

Average: 1-11

Enriched: 1-11

## Reinforcement

Assign *Other Ways* on page 105. Discuss the various scales used. Ask what kind of scale you would use to measure various masses: people, fish, bags of potatoes, and so on.

### 1. Mass 3

Estimate each mass. Then measure with a bathroom kilogram scales.

you a basketball  
a brick a globe  
a chair a big dictionary

### 2. Mass 4

Estimate each mass. Then measure with a spring gram scales.

a stapler a math book  
a pencil a box of crayons  
scissors a softball

## Enrichment

Assign these problem solving work cards.

### 1. Mass 5

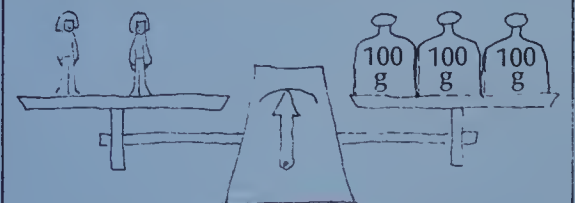
Use several scales, subtraction and addition to find each mass.

your desk  
classroom's heaviest table  
five of your classmates



### 2. Mass 6

What is the mass of one ?



### 3. Mass 7

Find the total mass.



## Extra Practice

Find the total mass.

7. 3 730g
2. 5 2050g
3. 2 8 3208g
1. 3 1003g
8. 1 810g
6. 3 4 9 6943g

## Worksheet M9

Pages 104-105

# UNIT 6 LESSON 3

## Objective GR1

Interpret and construct bar graphs.

## Introducing the Lesson

Use chart paper and 2 cm square coloured stickers to construct a *Hair Colour Bar Graph* with your class. First, tally the number of students having brown, black, blond(e), and red hair. Then, transform the information into a bar graph which includes a title and category names. The overhead is very effective in illustrating graphing.

The purpose of graphs is to facilitate visual comparisons of numerical information. As a group, list various observations about the *Hair Colour Bar Graph*. Include a wide range of math vocabulary: *more than, less than, most, least, etc.*

## Teaching the Lesson

Read and discuss Wilma's bar graph on page 106. Have the students explain each of Wilma's comments: *How does Wilma know two kids have black hair?* ...As a group, list other observations regarding the bar graph.

Note that each square is the same size and that the bar sits on the base of the graph. Ask the students to determine what is incorrect with the following graph. (Units in the bar are different, the third bar is not on the base, there are no title and category names.)



Finally, discuss the *Favourite Pets* graph in the Exercises section.

Each student could construct a bar graph to keep track of progress on math quizzes. Each quiz should have the same total mark to facilitate the graphing. This encourages students to compete with themselves.

# Graphing with Classes

Wilma's math group made this **bar graph**.

Wilma wrote down things she saw.

## HAIR COLOUR GRAPH



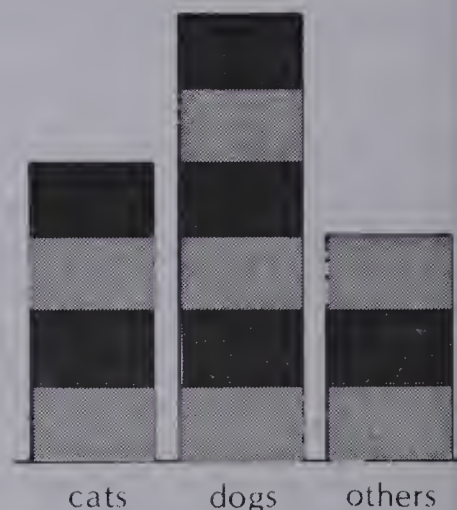
Wilma January  
Two kids have black hair.  
Brown is the tallest bar.  
There are two more blondes than redheads.  
Red is best.  
I'm a redhead.

## EXERCISES

Answer in a sentence.

1. How many students like dogs most? **6**
2. In all, how many children like cats or dogs most? **10**
3. How many fewer like cats than like dogs? **2**
4. What is the total number of students shown on the graph? **13**
5. What could the **other** pets be? Can you be sure? **anything**

## Favourite Pets



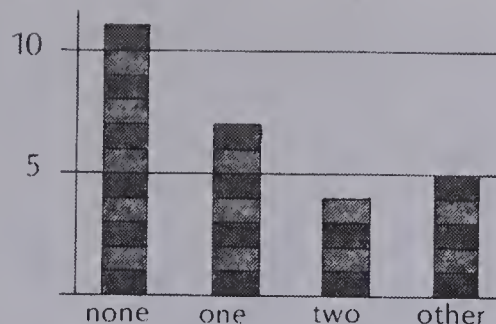
## Using the Exercises

- Exercise 1 requires the reading of a bar graph.
- Exercises 2 to 4 require bar graph interpretations involving addition and subtraction.
- Exercise 5 requires meaningful extrapolation beyond the facts.



Answer in a sentence.

- How many students have no sisters? *11*
- How many have 1 or 2 sisters? *11*
- How many more children have one sister than have two sisters? *3*
- What could **other** mean?  
*more than two sisters*



How Many Sisters?

Make a bar graph from each tally sheet.

- | Animal   | Tally |
|----------|-------|
| elephant |       |
| lion     |       |
| others   |       |

**Strongest Animal**

lion	
whale	
tiger	
elephant	

- | Colour | Tally |
|--------|-------|
| blue   |       |
| green  |       |
| other  |       |

**Favourite Colour**

blue	
orange	
red	
green	
purple	
yellow	

## Metric Measurement Graphs

Find the height of each classmate.  
Then complete the bar graphs.

*Answers will vary.*



Student Heights

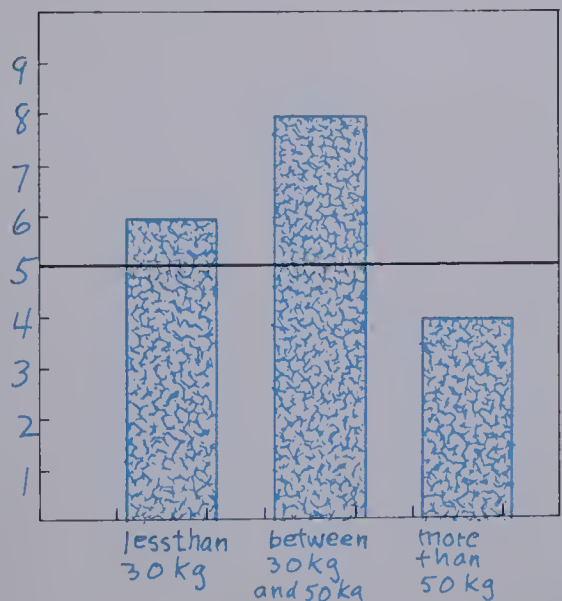
107

## Extra Practice

Make a bar graph.

### STUDENT MASSES

- |                         |  |
|-------------------------|--|
| less than 30 kg         |  |
| between 30 kg and 50 kg |  |
| more than 50 kg         |  |



## Worksheet GR1

Pages 106-107

## Assigning the Practice

Minimum: 1-5

Average: 1-6

Enriched: 1-6

## Reinforcement

### Metric Graph

Make a bar graph that has three bars using these masses.

Bob	25 kg	Nan	37 kg
Tom	26 kg	Sue	38 kg
Tim	31 kg	Ann	41 kg
Joy	34 kg	Ned	51 kg
Eve	37 kg	Rob	52 kg

## Enrichment

- Assign *Metric Measurement Graphs* on page 107.

A *Graphing with Classes* project provides an enjoyable integration of graphing, word problems, and data collection. Supply each of the students with a class list, a tally sheet, and special bar graph paper.

- On the first day, have each student choose a graphing topic of the following type to survey the class.

Length of (Arm)

Favourite (Colour)

Help the students choose topics which will yield suitable graphs. Several categories or ranges should contain several members.

Let the students survey every member of the class, recording answers on the class list.

- On the second day, help the students determine a suitable tally to summarize the information on their surveys. This entails choosing ranges for the topic *Length of \_\_\_\_\_* and suitable categories for the topic *Favourite \_\_\_\_\_*.

Have the students construct a bar graph from their tallies. Titles and category labels are to be included.

- On the next day, each student can compose five word problems related to his or her graph.

- Finally, put the students' graphs and word problems on display. Each student may answer 4-6 sets of other pupils' word problems.

## Objective M10

Estimate temperature and read a Celsius thermometer to one-degree intervals.

## Introducing the Lesson

Ask your students to suggest common temperature words: *hot, warm, cool, cold, chilly, freezing, lukewarm*, etc. Ask how the students feel right now (usually several feel warm and others feel cool). Note that the way a person feels is important, but isn't the same from one person to another. A reliable measure of temperature that will mean the same thing to everyone requires a system that does not depend on feelings.

## Teaching the Lesson

Have the students recall that the Celsius degree is the metric unit of temperature. It is named after its inventor Anders Celsius, a Swedish scientist who lived over 200 years ago. Temperature is measured with a Celsius thermometer. Using a thermometer chart, have the students practise reading temperatures first to ten-degree intervals, then to five-degree intervals, and finally to one-degree intervals. Point out that reading a thermometer is similar to reading a bar graph.

Have the students estimate various temperatures using the proper notation:  $\blacksquare^{\circ}\text{C}$ : inside, outside, ice, radiator, body temperature. Check some of these estimates with thermometers.

Read page 108 together. Point out that most outdoor temperatures fall within a limited range of temperatures. Have the students match various months, seasons, and activities with appropriate temperatures. (This obviously will vary with locale. Use simple, anecdotal examples that are typical of your area.)

# Temperature

The **thermometer** shows 17 degrees Celsius. This is usually written as  $17^{\circ}\text{C}$ .

Most outdoor temperatures come between the arrows.



$40^{\circ}\text{C}$   
 $30^{\circ}\text{C}$  Your body temperature is about  $37^{\circ}\text{C}$ .

$20^{\circ}\text{C}$   $21^{\circ}\text{C}$  is a comfortable indoor temperature.

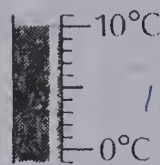
$0^{\circ}\text{C}$  Ice freezes at  $0^{\circ}\text{C}$ .

Temperatures **below zero** are very cold

## EXERCISES

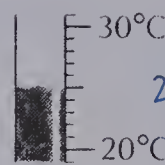
Write the temperatures.

1.



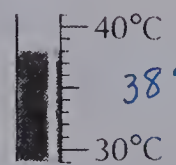
$10^{\circ}\text{C}$

2.



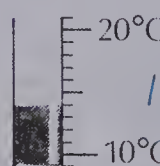
$25^{\circ}\text{C}$

3.



$38^{\circ}\text{C}$

4.



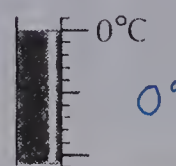
$14^{\circ}\text{C}$

5.



$27^{\circ}\text{C}$

6.



$0^{\circ}\text{C}$

## Using the Exercises

- Exercises 1 to 6 are concerned with the reading of Celsius thermometers to one-degree accuracy.



## PRACTICE



What is the temperature?

1. in Ottawa  $19^{\circ}\text{C}$
2. in Surrey  $27^{\circ}\text{C}$
3. in Inuvik  $1^{\circ}\text{C}$
4. in Calgary  $15^{\circ}\text{C}$

5. Which cities are warmer than ten degrees Celsius?

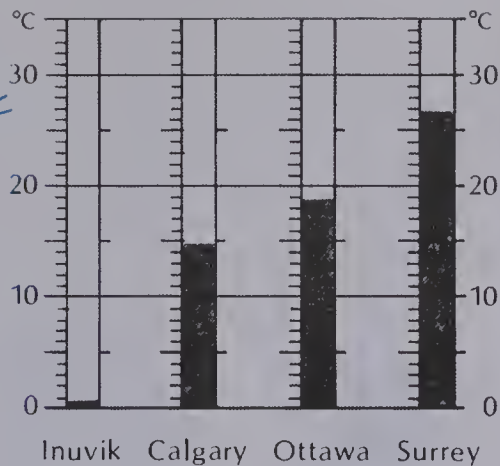
Calgary, Ottawa, Surrey

Match these with a city.

6.  Surrey
7.  Inuvik

What is the difference?

8. between Surrey and Ottawa  $8^{\circ}\text{C}$
9. between Calgary and Surrey  $12^{\circ}\text{C}$



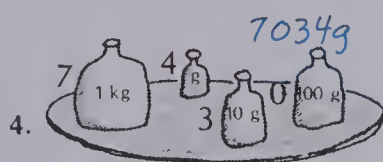
## REVIEW

Which mass and height make sense for a child?

1. 38 g or 38 kg
2. 120 cm or 120 m

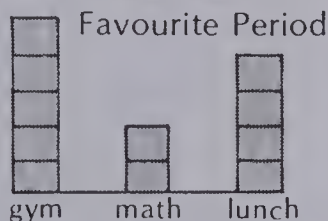
Find the total mass.

3. 3  $100\text{ g}$ , 5  $10\text{ g}$ , 8  $1\text{ g}$   $358\text{ g}$



Answer each question.

5. How many liked lunch? 4
6. How many more liked gym than math? 3
7. How many voted in all? 11



109

## Assigning the Practice

Minimum: 1-5

Average: 1-9

Enriched: 1-9

## Review Exercises

Questions	Objectives	Pages
1-2	M8	102-103
3-4	M9	104-105
5-7	GR1	106-107

## Reinforcement

1. As a class keep a record of outdoor temperature in the form of a bar graph. Be certain to check at the same time of day, say 9:30.

2. For this work card, the choice of pictures will determine the temperatures listed.

### Temperature

Match the 10 pictures with the following temperatures.

$0^{\circ}\text{C}$   $5^{\circ}\text{C}$   $10^{\circ}\text{C}$   $15^{\circ}\text{C}$   $20^{\circ}\text{C}$

## Enrichment

Use the following temperature tables for enrichment activities.

1. bar graph construction
2. spring-board to library research
3. matching jigsaw puzzles

Mammals	goats	$40^{\circ}\text{C}$
	humans	$37^{\circ}\text{C}$
	anteaters	$23^{\circ}\text{C}$
Birds	jays	$43^{\circ}\text{C}$
	owls	$40^{\circ}\text{C}$
	Arctic gulls	$34^{\circ}\text{C}$
Reptiles	horned lizards	$35^{\circ}\text{C}$
	pythons	$29^{\circ}\text{C}$
	garter snakes	$22^{\circ}\text{C}$
Fish and Amphibians	bullfrogs	$25^{\circ}\text{C}$
	catfish	$20^{\circ}\text{C}$
	perch	$16^{\circ}\text{C}$

## Extra Practice

## Worksheet M10

Pages 108-109

What are the temperatures?

Answers will vary.

Estimate. Then measure with a thermometer.

	Estimate	Measure
Outside		
Inside		
Next to a lamp		
Tap water		
Boiling water		
(Don't touch!)		



## Objective M11

Tell time to five-minute intervals.

### Introducing the Lesson

Ask the students to suggest things lasting about one hour: *some television programs, the Math period, lunch period,...*

Have the students recall that there are 24 hours in each day. Using an hour dial drawn on transparent plastic, show that it takes two revolutions of the short hour hand to complete 24 hours.

Have the students recall that there are 60 minutes in each hour. Using a minute dial drawn on tagboard, count by 5 minute intervals to 60.

### Teaching the Lesson

A standard clock face consists of an explicit hour dial and an implicit minute dial. Show this by superimposing a plastic hour dial on a tagboard minute dial. (What should remain are minute and hour markers and numerals representing hours. The minute numerals are covered and lost.)

Using just the hour dial, read and record various positions of the hour hand. (3 hours, 3:■). Point out that 12, instead of 0, appears on the hour dial and clock face.

Using the minute dial, read and record positions of the minute hand at various 5-minute intervals. (10 minutes, ■:10). Note that:

1. the minute numbers do not appear on the clock and
2. 00 appears on the minute dial rather than 60 (opposite to the treatment of hours).

After reading page 110, practise analysing, writing, and saying the following times using a standard clock face: 7:10, 9:30, 4:00, 6:00, 1:50, 12:15, 12:35, 5:05.

7 hours and 10 minutes    7:10    seven ten  
5 hours and 5 minutes    5:05    five-o-five  
4 hours and 0 minutes    4:00    four o'clock

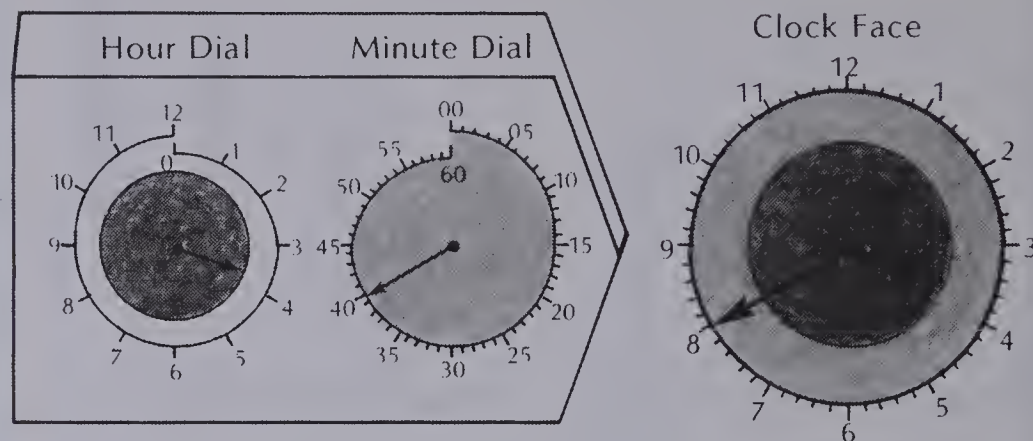
## Clock Dials

There are 12 hours in half a day.

The **hour hand** shows over 3 hours on the **hour dial** below.

There 60 minutes in an hour.

The minute hand shows 40 minutes on the minute dial.



For 3 hours and 40 minutes you write 3:40.

### EXERCISES

1. Count by 5's from 0 to 55. *5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55*

Write how many hours. Write how many minutes.

2. 2h, 25min
3. 5h, 10min
4. 9h, 15min
5. 11h, 35min
6. 6h, 5min
7. 9h, 20min
8. 8h, 0min
9. 12h, 30min

10. Which is longer: the minute hand or the hour hand? *minute*

### Using the Exercises

- Exercise 1 reviews counting by fives.
- Exercises 2 to 9 require the student to write the time from a clock face.
- Exercise 10 reviews the distinction between the hour and minute hand.

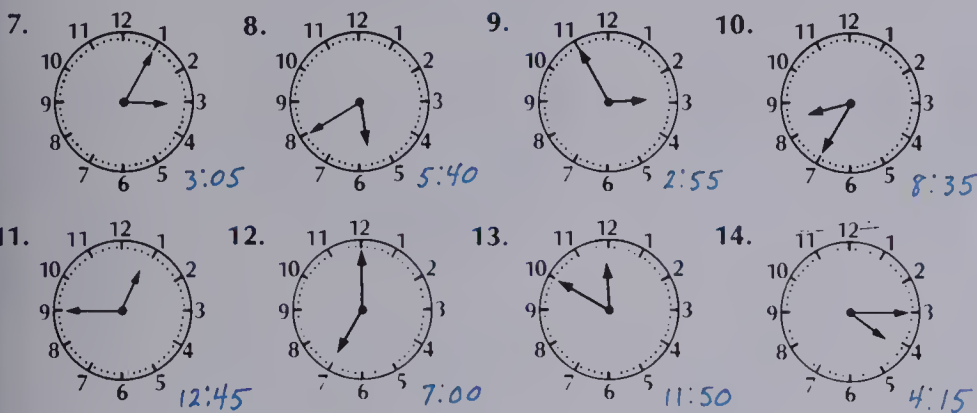


## PRACTICE

Write the time.

9:20

1. 7 hours and 15 minutes 7:15
2. 3 hours and 20 minutes 3:20
3. 2 hours and 45 minutes 2:45
4. 1 hour and 50 minutes 1:50
5. 8 hours and no minutes 8:00
6. 12 hours and 5 minutes 12:05



Show these times. Trace the clock face on page 110.

15. 6:30
16. 8:00
17. 3:45
18. 9:15
19. 1:50
20. 4:05
21. 2:35
22. 12:25

## It's About Time for You

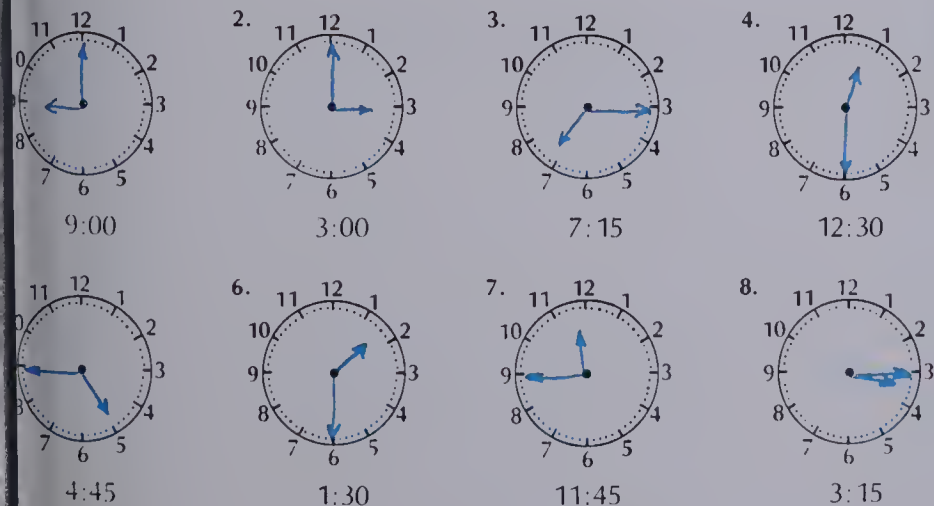
Complete a **reasonable** sentence.

1. I eat lunch in about: 15 seconds or 15 minutes
2. I sleep for about: 9 hours or 9 minutes
3. I blink about every: 30 seconds or 30 minutes
4. My heart beats once every: minute or second
5. A school day lasts about: 6 hours or 6 minutes
6. I breathe once every: 12 seconds or 12 minutes
7. Each day has exactly: 24 minutes or 24 hours

111

## Extra Practice

Show the time.



## Worksheet M11

Pages 110-111

## Assigning the Practice

Minimum: odd numbers

Average: 1-22

Enriched: 1-22

## Reinforcement

1. After group discussion, assign *It's About Time for You* on page 111. Set aside bulletin board space for the students to contribute illustrations for other examples.

2. Provide clock stamps or clock models at a measurement centre. Use "self-checking" work cards.

### Time 1

Set the 8 clock faces.

2:10	11:20	5:40	8:50
3:20	1:50	12:50	6:40

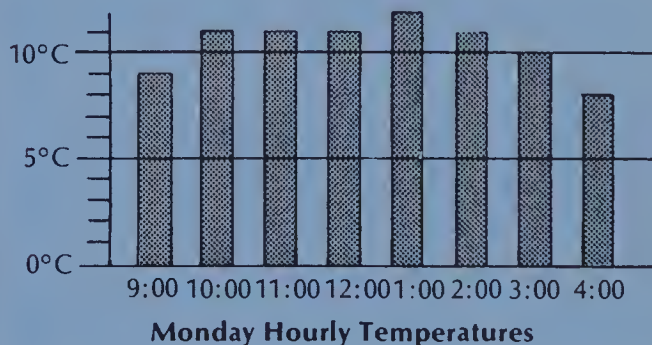
### Time 2

Set the 8 clock faces.

6:05	8:35	1:55	7:25
12:35	11:05	4:25	9:55

## Enrichment

1. For the rest of the week, keep an hourly graph of the outside temperature. Have the students try to recall and explain fluctuations. Compare the graphs.



2. For time to be measured, it must be compared with a repeating or cyclic occurrence. Analyse these cycles.

### Human Rhythms (natural)

heart beat	60-120 times/minute
hunger	1-4 times / day
sleepiness	1-2 times / day
thirst	3-5 times / day

### Human Plans (artificial)

school day	schedule
vacation day	schedule

## Objective M12

Tell time to one-minute intervals for dial and digital clocks.

## Introducing the Lesson

Practise writing and saying the following times from a standard clock face: 6:15, 11:15, 4:30, 1:30, 2:45, 7:45, 9:00, 11:00.

Have the students try to memorize the 15-minute interval positions: :00, :15, :30, and :45.

Display several dial clocks and digital clocks. See which the students find easier to read.

Count by 5s and then count on by 1s to the numbers 11, 19, 27, 44,...

"5, 10, 15, 20, 25, 26, 27"

## Teaching the Lesson

Read the presentation on page 112. Relate the thoughts of the sheep to the position of the minute hand.

Explain one alternate way of saying time using "past", e.g., sixteen past nine. Practise translating between these elements.

dial clocks saying time ↔ digital faces telling time (past)

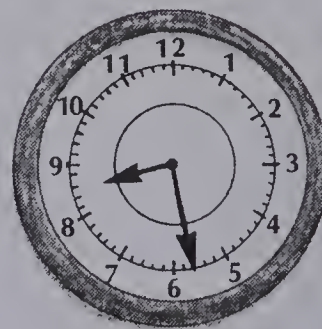
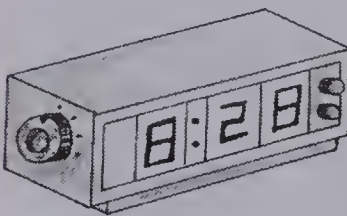
Investigate how your sample digital clocks record hours below ten (09:16 or 9:16).

# Telling Time to the Minute

The two clocks show the same time.

This is a **digital face**.

This is a **dial face**.



5  
10  
15  
20  
25  
26  
27  
28



We say eight twenty-eight or twenty-eight **past** eight.

## EXERCISES

Count using 5's and 1's.

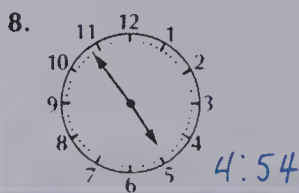
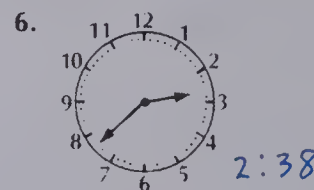
1. to 18

2. to 38

3. to 43

4. to 54

Show the time on a digital face.



112

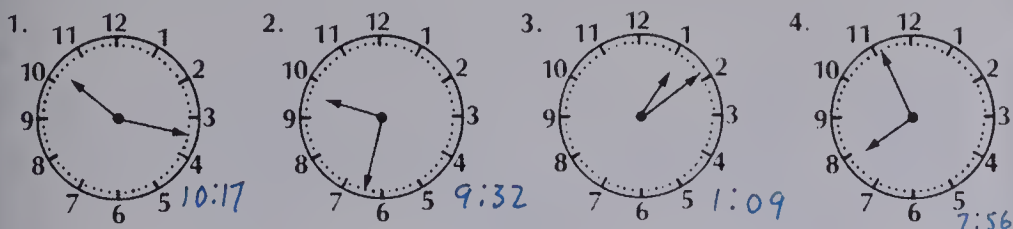
## Using the Exercises

- Exercises 1 to 4 have the student practise counting by 5s and on by 1s.
- Exercises 5 to 10 require translating time on a dial face to that on a digital face (essentially, writing the time).

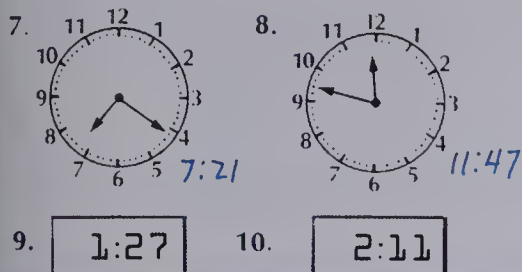


## PRACTICE

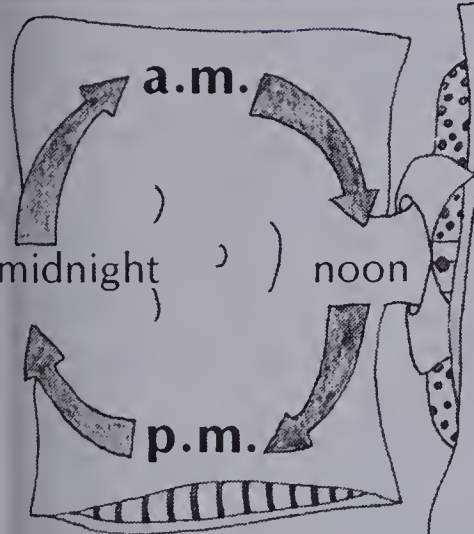
Show the time on a different clock face.



Write each time in **two** ways. Here's a helping hand!



one  
past  
eleven  
twenty  
seven  
two  
forty



When do these happen for you?

Bedtime: 8:30 p.m.

1. wake up
2. breakfast
3. dinner
4. school ends
5. school starts
6. gym time
7. math time
8. recess

Answers will vary.

113

## Assigning the Practice

Minimum: 1-7

Average: 1-10

Enriched: 1-10

## Reinforcement

1. Take the opportunity of telling the time in class throughout the day. In particular, focus on time-related events such as warning-bell times, beginning of science period, etc.

### 2. Time 3

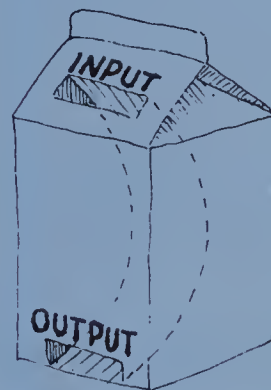
Set the 8 clock faces.

2:13	11:21	5:42	8:51
3:24	1:52	12:54	6:43

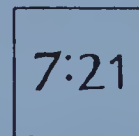
3. Have the students construct fanciful clocks with minute numbers from 0 to 59 included.

4. Set up a commercial toy clock that provides *telling time* drill.

5. Construct a milk carton computer for *telling time* drill.



front



back

## Enrichment

1. Assign a.m., p.m. on page 113.

2. Other conventions for telling time exist. Discuss and practise these common forms.

The number of minutes before an hour.  
14 to 7

Thirty minutes after the hour.

half past 7

Fifteen minutes after the hour.

a quarter past 7

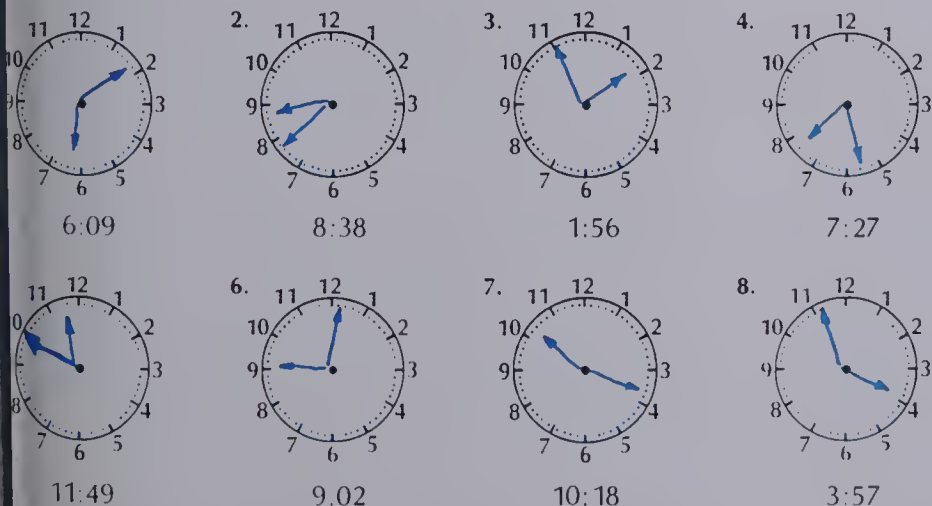
Fifteen minutes before the hour.

a quarter to 7

Half and quarter hours are discussed again in Unit 13 when fractions are presented.

## Extra Practice

Show the time.



## Worksheet M12

Pages 112-113

## Objective PS9

Compare measurements involving time, length, and mass.

## Introducing the Lesson

Review the comparison of 3-digit and 4-digit numbers. Use enough examples to cover the common situations, symbols, and vocabulary.

$321 > 123$ ,  $629 < 690$   
 174 is greater than 172.  
 1325 is less than 2156.

## Teaching the Lesson

Discuss the ringing of the lunch bell at 12:00. Ask what times are called 12 o'clock. Establish that noon and midnight both are called 12 o'clock. Use the drawing on page 113 to explain the concept of a.m. and p.m. Practise time comparisons similar to those on page 114.

Recall the equations:

$100 \text{ cm} = 1 \text{ m}$  and  $1000 \text{ m} = 1 \text{ km}$

Practise length comparisons like those on page 114. Include 2-step examples like problems 13-16.

Recall the mass equation  $1000 \text{ g} = 1 \text{ kg}$ . Practise mass comparisons like those on page 114. Include 2-step examples like problems 21-24.

## Reinforcement

With a clock stamp construct a 10 by 10 grid containing clocks set at different times. Challenge students to find the path that places all the times in order.



## Enrichment

Assign *More!* on page 114. Although solution methods may vary, multiple steps will be required to change the two choices to comparable units.

# Metric Comparisons

Time: Which is later?

1. 3:35 or 2:58
2. 7:31 or 6:29
3. 1:49 or 1:52
4. 6:19 or 6:35
5. noon or 11:00 a.m.
6. noon or 3:00 p.m.
7. midnight or 1:00 a.m.
8. midnight or 8:30 p.m.

Length: Which is longer?

9. your arm or 1 m
10. your nose or 9 cm
11. your foot or 1 dm
12. your thumb or 3 cm
13. 103 cm or 1 m
14. 698 cm or 7 m
15. 2000 m or 1 km
16. 3900 m or 4 km

Mass: Which is heavier?

17. your shoe or 20 kg
18. your chair or 20 g
19. your pencil or 1 g
20. your desk or 1 kg
21. 2000 g or 3 kg
22. 3000 g or 2 kg
23. 1042 g or 1 kg
24. 7100 g or 8 kg

## More!

Which is longer?

25. 93 cm and 58 cm or 142 cm
26. 65 cm and 75 cm or 142 cm
27. 1 hour and 43 minutes or 99 minutes
28. 1 hour and 90 minutes or 140 minutes
29. 2 hours and 10 minutes or 180 minutes
30. 3 hours and 20 minutes or 250 minutes

## Problem Solving Activities

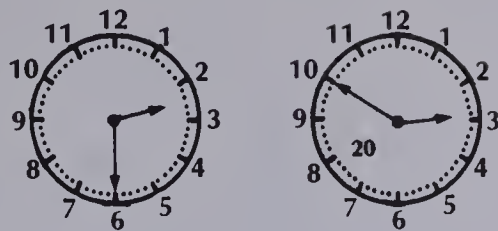
Assign Level 3, Unit 6.



# Models Please

Working with a **model** helps you solve problems.

Use a clock model to find the answers.



1. Ben started at 2:30.  
He worked 20 minutes.  
When did he stop?  
2:50
2. Jill came at 6:15.  
She left in 30 minutes.  
When did she leave?  
6:45
3. The cat left at 6:13.  
He was gone 28 minutes.  
When did he return?  
6:41
4. The lion began at 10:55.  
He played for 10 minutes.  
When did he stop?  
11:05
5. The bear woke up at 7:45.  
She ate for 34 minutes.  
When was she done?  
8:19
6. The dog came at 9:30.  
It left after 2 hours.  
When did it go?  
11:30
7. The chimp arrived at 4:27.  
She stayed one hour  
and 8 minutes.  
When did she leave? 5:35

In 35 minutes, what time will it be?

The time is now:

- |                        |                        |                         |                           |
|------------------------|------------------------|-------------------------|---------------------------|
| 8. 4:20<br><u>4:55</u> | 9. 6:15<br><u>6:50</u> | 10. 3:50<br><u>4:25</u> | 11. 10:43<br><u>11:18</u> |
|------------------------|------------------------|-------------------------|---------------------------|

In 3 hours and 15 minutes, what time will it be?

The time is now:

- |                         |                          |                         |                          |     |
|-------------------------|--------------------------|-------------------------|--------------------------|-----|
| 12. 4:15<br><u>7:30</u> | 13. 8:30<br><u>11:45</u> | 14. 4:55<br><u>8:10</u> | 15. 10:45<br><u>2:00</u> | 115 |
|-------------------------|--------------------------|-------------------------|--------------------------|-----|

## Objective PS10

Use a concrete model to solve addition problems involving time.

## Introducing the Lesson

Distribute a set of clock models having moveable hands. Let pairs of students practise setting the clocks using a game format or a challenge task.

Starting with the clocks set at 9:00, count ahead by 5-minute intervals until reaching 12:00. Practise counting ahead using various intervals: 10 minutes, 1 minute, 1 hour,...

## Teaching the Lesson

Discuss and "model" with a clock the following examples.

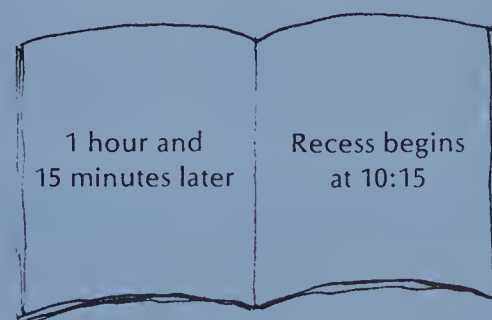
Joe began at 4:20.  
He ran for 30 minutes.  
When did he stop?

Mary fell asleep at 9:45.  
She slept for 28 minutes.  
When did she awake?

Fred played for 1 hour and 20 minutes.  
He began at 6:45.  
When did he stop?

## Enrichment

Have each student write and illustrate a booklet entitled *My Time*. The left-hand page should focus on the passage of time between events.



## Extra Practice

## Worksheet PS9-PS10

Pages 114-115

Which is later?

- |                              |                        |                        |
|------------------------------|------------------------|------------------------|
| 1. 3:50 or <u>5:30</u>       | 2. <u>1:10</u> or 1:01 | 3. 3:35 or <u>3:53</u> |
| 4. 11 a.m. or <u>11 p.m.</u> | 5. <u>3:00</u> or 2:58 | 6. <u>2:45</u> or 1:54 |

What time will it be in 15 minutes?

- |                      |                      |                       |
|----------------------|----------------------|-----------------------|
| 7. 6:15 <u>6:30</u>  | 8. 3:45 <u>4:00</u>  | 9. 11:50 <u>12:05</u> |
| 10. 2:28 <u>2:43</u> | 11. 6:47 <u>7:02</u> | 12. 1:53 <u>2:08</u>  |

What time was it 15 minutes earlier?

- |                        |                        |                        |
|------------------------|------------------------|------------------------|
| 13. 7:00 <u>6:45</u>   | 14. 5:32 <u>5:17</u>   | 15. 11:08 <u>10:53</u> |
| 16. 12:14 <u>11:59</u> | 17. 10:44 <u>10:29</u> | 18. 2:10 <u>1:55</u>   |

## Objective M13

Read and write dates and order days, months, seasons, years, and dates.

## Introducing the Lesson

Using page 116 discuss the following ideas.

1. Every year contains 12 months.
2. The months and seasons form a repeating pattern called a cycle.
3. The months are ordered, beginning with January, by convention, and ending with December.
4. Each month, except February, contains either 30 or 31 days.

## Teaching the Lesson

Cut out and mix the months from an old calendar. Have the students read the months and place them in order beneath a chalk tray. Write 1 to 12 above the corresponding months. Mix and again order the months focusing on the number of each month.

Pick one day from a month. Demonstrate how to write the date:

June 13, 1987.

Have the students locate and write their birthdays on the calendar pages. Discuss several examples.

Remind the students that numbers are arranged so that the place values occur in descending order. Investigate how the pattern year-month-day has the same descending form. Practise transforming dates into this ordered form.

June 13, 1987

1987-June-13

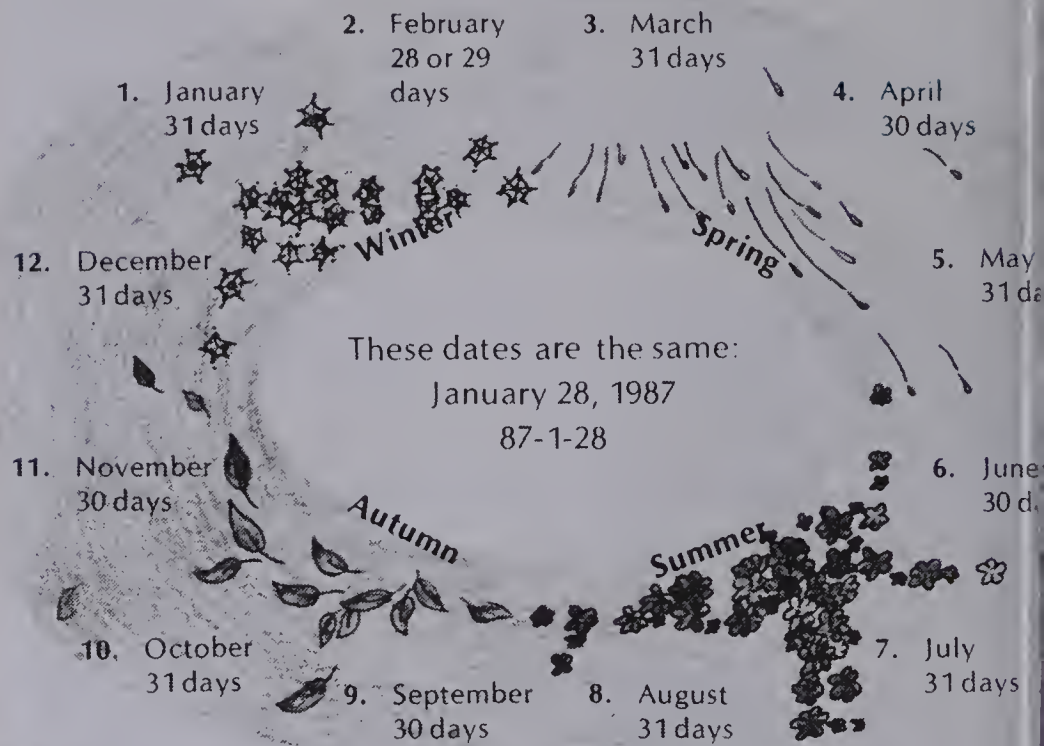
87-6-13

For each date you have discussed, write the dates of the day before and of the day after.

Practise comparing dates. Use an approach that is associated with the comparison of place values for numbers. That is, compare years, then compare months, and then compare days.

## Dates: Year, Month, Day

The 12 months are in the same order each year. Like the seasons, they form an endless pattern.



## EXERCISES

Which is longer?

1. a month or a day
2. January or the 28th day
3. a month or a year
4. January or 1987

Order the parts of each date from the longest to the shortest.

Example: March 13, 1954 → 1954 March 13 → 54-3-13

5. December 25, 1930 30-12-25
6. April 7, 1999 99-4-7
7. September 19, 1984 84-9-19
8. August 31, 1986 86-8-31

## Using the Exercises

- Exercises 1 to 4 ask for comparisons of the time units year, month, and day.
- Exercises 5 to 8 require translation from common date form to descending date form.



## PRACTICE

Write each date in a different way.

1. May 17, 1979 <sup>79-5-17</sup>
2. June 2, 1985 <sup>85-6-2</sup>
3. April 15, 1976 <sup>76-4-15</sup>
4. March 8, 1986 <sup>86-3-8</sup>
5. July 31, 1984 <sup>84-7-31</sup>
6. August 24, 1987 <sup>87-8-24</sup>
7. 88-12-25 <sup>Dec. 25, 1988</sup>
8. 78-10-3 <sup>Oct. 3, 1978</sup>
9. 94-9-6 <sup>Sept. 6, 1994</sup>
10. 86-2-17 <sup>Feb. 17, 1986</sup>
11. 87-11-4 <sup>Nov. 4, 1987</sup>
12. 84-8-31 <sup>Aug. 31, 1984</sup>

Write the months.

13. with 31 days
14. of spring
15. of winter
16. with 30 days
17. of summer
18. of autumn
19. Copy the chart. Write the missing dates.

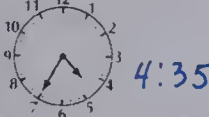
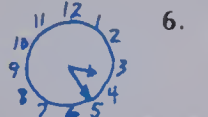
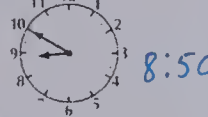
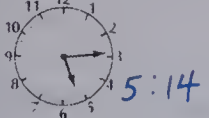
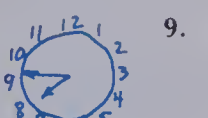

Yesterday	Today	Tomorrow
June 2, 1985	June 3, 1985	June 4, 1985
May 30, 1987	May 31, 1987	June 1, 1987
89-2-19	89-2-20	89-2-21
95-10-31	95-11-1	95-11-2

## REVIEW

Write the temperatures.

1.  20°C  
15°C
2.  10°C  
7°C
3.  30°C  
28°C

Change to a different clock face.

4.  4:35
5.  3:25
6.  8:50
7.  5:14
8.  7:47
9.  12:21

117

## Assigning the Practice

Minimum: 1-18

Average: 1-18

Enriched: 1-19

## Review Exercises

Questions	Objectives	Pages
M10	1-3	108-109
M11	4-6	110-111
M12	7-9	112-113

## Reinforcement

1. During your sharing time, have a classroom weather chart updated.

Today is Tuesday,  
January 24th, 1986.  
 The weather is sunny.  
 The temperature is 2°C.

2. Practise this famous jingle.

Thirty days have September,  
 April, June, and November.  
 All the rest have 31,  
 Except February alone  
 Which has but 28 days clear  
 and 29 in each leap year.

## Enrichment

1. Time 4

Add 9 days to each date.

June 14	May 6
August 23	March 26
April 29	December 25

Use a calendar to check.

2. Share John Burnington's book *Seasons* together. Have your students write and illustrate a book on the seasons.

## Extra Practice

## Worksheet M13

Pages 116-117

Complete the chart.

Yesterday	Today	Tomorrow
1984-3-20	1984-3-21	1984-3-22
1990-10-3	1990-10-4	1990-10-5
1943-2-6	1943-2-7	1943-2-8
1976-12-15	1976-12-16	1976-12-17
1989-3-15	1989-3-16	1989-3-17
1984-1-31	1984-2-1	1984-2-2
1988-5-30	1988-5-31	1988-6-1
1987-12-31	1988-1-1	1988-1-2

Unit 6 Objective	Test Questions	Pages
M8	1-4	102-103
M9	5-8	104-105
M10	9-11	108-109
M11	12-14	110-111
M12	15-17	112-113
M13	18-20	116-117

# TEST

# UNIT 6

Pick the more reasonable mass and length.



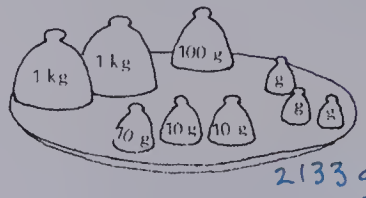
1. 35 cm or 35 m      2. 4 g or 4 kg



3. 7 m or 7 cm      4. 30 g or 30 kg

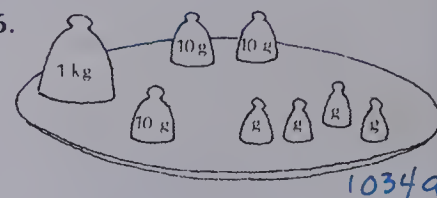
Find the total mass.

5.



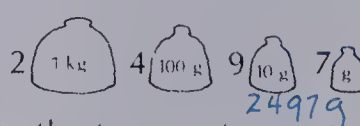
2133 g

6.



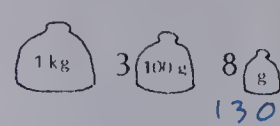
1034 g

7.



2497 g

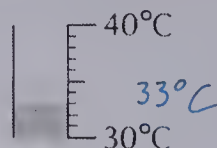
8.



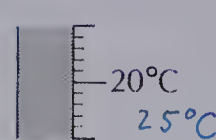
1308 g

Write the temperature.

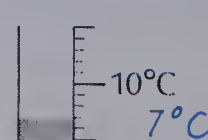
9.



10.

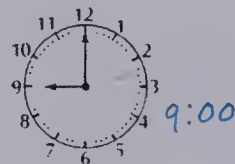


11.



Show each time or date the other way.

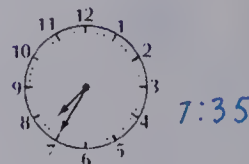
12.



13.



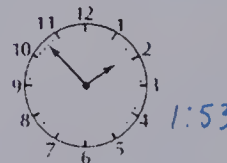
14.



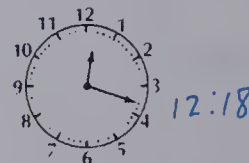
15.



16.



17.



18. 87-5-15

19. 47-6-14

20. 86-2-4 February 4, 1986

## Post-test

## Unit

Pick the more reasonable mass and length.



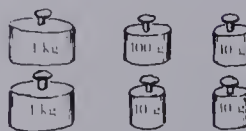
1. 4 m or 5 km      2. 1000 g or 1000 kg



3. 12 cm or 12 m      4. 10 g or 100 g

Find the total mass.

5.



2130 g

6.



1054 g

7.



2369 g

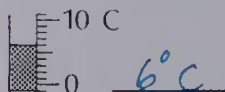
8.



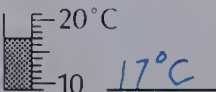
5090 g

What is the temperature?

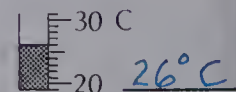
9.



10.



11.





## SUBTRACTION

Subtract.

1. 
$$\begin{array}{r} 59 \\ - 32 \\ \hline 27 \end{array}$$
2. 
$$\begin{array}{r} 91 \\ - 70 \\ \hline 21 \end{array}$$
3. 
$$\begin{array}{r} 88 \\ - 7 \\ \hline 81 \end{array}$$
4. 
$$\begin{array}{r} 35 \\ - 15 \\ \hline 20 \end{array}$$
5. 
$$\begin{array}{r} 46 \\ - 41 \\ \hline 5 \end{array}$$
6. 
$$\begin{array}{r} 17 \\ - 9 \\ \hline 8 \end{array}$$
7. 
$$\begin{array}{r} 35 \\ - 7 \\ \hline 28 \end{array}$$
8. 
$$\begin{array}{r} 52 \\ - 6 \\ \hline 46 \end{array}$$
9. 
$$\begin{array}{r} 60 \\ - 8 \\ \hline 52 \end{array}$$
10. 
$$\begin{array}{r} 92 \\ - 3 \\ \hline 89 \end{array}$$
11. 
$$\begin{array}{r} 83 \\ - 17 \\ \hline 66 \end{array}$$
12. 
$$\begin{array}{r} 42 \\ - 28 \\ \hline 14 \end{array}$$
13. 
$$\begin{array}{r} 78 \\ - 69 \\ \hline 9 \end{array}$$
14. 
$$\begin{array}{r} 61 \\ - 23 \\ \hline 38 \end{array}$$
15. 
$$\begin{array}{r} 30 \\ - 17 \\ \hline 13 \end{array}$$
16. 
$$\begin{array}{r} 130 \\ - 80 \\ \hline 50 \end{array}$$
17. 
$$\begin{array}{r} 142 \\ - 71 \\ \hline 71 \end{array}$$
18. 
$$\begin{array}{r} 146 \\ - 96 \\ \hline 50 \end{array}$$
19. 
$$\begin{array}{r} 127 \\ - 50 \\ \hline 77 \end{array}$$
20. 
$$\begin{array}{r} 124 \\ - 92 \\ \hline 32 \end{array}$$
21. 
$$\begin{array}{r} 120 \\ - 43 \\ \hline 77 \end{array}$$
22. 
$$\begin{array}{r} 102 \\ - 78 \\ \hline 24 \end{array}$$
23. 
$$\begin{array}{r} 100 \\ - 17 \\ \hline 83 \end{array}$$
24. 
$$\begin{array}{r} 106 \\ - 48 \\ \hline 58 \end{array}$$
25. 
$$\begin{array}{r} 105 \\ - 98 \\ \hline 7 \end{array}$$

Find the difference between:

26. 92 and 47 45      27. 23 and 110 87

Do the problem. Then check by undoing.

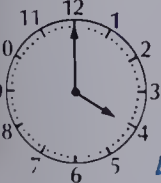



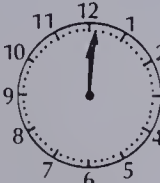

28. 
$$\begin{array}{r} 56 \\ + 22 \\ \hline 78 \end{array}$$
29. 
$$\begin{array}{r} 93 \\ + 48 \\ \hline 141 \end{array}$$
30. 
$$\begin{array}{r} 65 \\ - 27 \\ \hline 38 \end{array}$$
31. 
$$\begin{array}{r} 162 \\ - 77 \\ \hline 85 \end{array}$$

Solve.

35 cm  
97 cm

32. How long altogether? 132 cm
33. What is the difference in length? 62 cm

What is the time?

12.  4:00
13.  6:45
14.  10:25
15.  1:34
16.  12:01
17.  8:47

Write each date in another way.

18. January 7, 1988 1988-1-7
19. 90-12-25 December 25, 1990
20. 1984-1-2 January 2, 1984

# UNIT 7

## Multiplication

Theme: Garage Sale

Lesson		Objective	Vocabulary	Materials
Preview		Add up to four identical addends.	code	flash cards for the addition doubles
1	N8	Skip count by twos, threes, fours, fives, and tens.	skip count	100 chart (poster size)
2	A22	Relate multiplication to addition for products to 21 in horizontal form.	multiply, times, equation	21 cookies (or bingo chips) 4 or 5 trays
3	A23	Understand the order property for multiplication with products to 21 in horizontal form.	factor, product, order	30 counters (magnetic ones optional)
4	PS11	Choose the correct operation in solving a word problem.		
	PS12	Use relevant information in solving a word problem.		
5	A24	Multiply with 2 as a factor in products to 18.	two times table	blank multiplication wall chart
6	A25	Multiply with 5 as a factor in products to 45.	five times table	
7	A26	Multiply with 3 as a factor in products to 27.	three times table	
8	A27	Multiply with 4 as a factor in products to 36.	four times table	36 pennies
Test		Multiplication facts with products to 45.		
Review		Measurement of length, mass, and time.		

7




# About This Unit

The aims of this unit are:

1. to introduce the multiplication concept as the joining of equivalent sets of objects
2. to introduce the order or commutative property for multiplication
3. to develop the 2, 5, and 3 times tables using the repeated addition model for multiplication

For example:



$$\begin{aligned}
 5 + 5 + 5 &= 15 \\
 3 \text{ fives} &= 15 \\
 3 \times 5 &= 15
 \end{aligned}$$

4. to introduce the distributive property of multiplication over addition with the 4 times table.

For example:

$$\begin{aligned}
 4 \times 6 & \quad \begin{array}{|c|} \hline \times \times \times \times \times \times \\ \hline \times \times \times \times \times \times \\ \hline \times \times \times \times \times \times \\ \hline \times \times \times \times \times \times \\ \hline \end{array} \quad \begin{aligned} 2 \times 6 &= 12 \\ &+ \quad 24 \\ 2 \times 6 &= 12 \end{aligned}
 \end{aligned}$$

5. to introduce a drill program for mastery of the 2, 5, 3, and 4 times tables.

The use of concrete materials is to be emphasized throughout this unit to develop understanding of the multiplication concept, particularly as it relates to the development of the basic facts. The distributive property of multiplication over addition is introduced with the 4 times table as it is used extensively in Unit 12 to develop the larger multiplication facts. The horizontal form for multiplying is used exclusively throughout this unit.

Mastery of the 2, 5, 3, and 4 times tables is to be expected following Unit 7 and before starting Unit 12. As with mastery of the addition facts, 3-second recall is considered mastery of the multiplication facts. Begin a drill program only *after* students are able to solve the multiplication facts and are ready to commit them to memory. For the majority of students, this probably will be after the lessons in Unit 7 have been taught, understood, and practised.

## Ideas

1. Organize a bulletin board display for a garage sale by the class. Have the students cut out pictures from magazines, catalogs, and newspapers of things they would like to buy (preferably more than one of each item) and price them. As a class, discuss the items

emphasizing “groups of \_\_\_\_\_” whenever possible, and determining the cost of multiple items by repeated addition and by multiplication.

2. Have a “classroom sale” of items the students make or bring from home, for example, comic books, toy cars, costume jewellery, ornaments, baked goods, etc. The students can be guided to handle the advertising, displaying, pricing, and selling of each item. The money collected can be used to purchase something for the classroom, such as an aquarium or pet.
3. A drill program for mastery of the 2, 5, 3, and 4 times tables should be organized following the teaching of Unit 7. The following are suggestions for such a program.
  - a. Organize a daily, 5-minute drill session before lunch or recess for one month. Provide for individualized progress using a meaningful sequence of short written quizzes. (See Grade 3 duplicating masters.) Allow students to choose the appropriate quiz and to mark and record their results on a Multiplication Fact Master Card in the following way.

×	0	1	2	3	4	5	6	7	8	9
0										
1										
2										
3										
4										
5										
6										
7										
8										
9										

1st time correct—light shading

2nd time correct—dark shading

3rd time correct—stickers

- b. Provide flash cards for the 2, 5, 3, and 4 times tables. Have students work individually and in pairs to practise the facts orally.
  - c. Provide games which involve the practice of the basic multiplication facts. Refer to the Reinforcement and Enrichment sections in Unit 7 for game ideas.
4. Discuss the purpose of advertising using ads from newspapers, magazines, and flyers. Have a contest during creative writing and art periods to design advertising for the “classroom sale”.



5. Discuss other types of sales that students could organize, e.g., lemonade, popcorn, etc. Discuss the common concerns of any type of sale, for example, pricing, advertising, age group of buyers, duration of sale, promotions, etc. Prepare a chart of the kinds of sales with ideas for each area of concern.

	lemonade sale	popcorn sale
Price		
Advertising		
Length of sale		
Place		

## UNIT 7

### MULTIPLICATION FACTS I



Unit 7 Objective	Test Questions	Pages
N8	1-8	122-123
A22	9-14	124-125
A23	15-21	126-127
A24	18-29	130-131
A25	30-37	132-133
A26	38-45	134-135
A27	46-53	136-137

#### Pretest

Unit

Complete.

- 2, 4, 6, 8, 10, 12
- 3, 6, 9, 12, 15, 18
- 4, 8, 12, 16, 20, 24
- 5, 10, 15, 20, 25, 30
- $5 + 5 = \underline{10}$
- $10 + 5 = \underline{15}$
- $15 + 5 = \underline{20}$
- $20 + 5 = \underline{25}$
- $4 + 4 = \underline{8}$
- $2 \times 4 = \underline{8}$
- $2 \times 3 = \underline{6}$
- $3 + 3 = \underline{6}$
- $3 + 3 + 3 + 3 = \underline{12}$
- $4 \times 3 = \underline{12}$
- $6 \times 3 = 3 \times \underline{6}$
- $4 \times 5 = \underline{5} \times 4$
- $4 \times 9 = 9 \times \underline{4}$
- $3 \times 4 = \underline{12}$
- $4 \times 3 = \underline{12}$
- $1 \times 4 = \underline{4}$
- $4 \times 1 = \underline{4}$
- $2 \times 6 = \underline{12}$
- $3 \times 2 = \underline{6}$



# Crack the Code

Add.

$$\begin{array}{r} 1 \\ 6 \quad 1 \quad 4 \quad 2 \\ +6 \quad +1 \quad +4 \quad +2 \\ \hline 12 \quad 3 \quad 8 \quad 6 \\ \text{T} \quad \text{U} \quad \text{R} \quad \text{N} \end{array}$$

$$\begin{array}{r} 2. \quad 4 \quad 8 \\ 4 \quad 30 \quad 8 \\ +4 \quad +30 \quad +8 \\ \hline 12 \quad 60 \quad 24 \\ \text{T} \quad \text{H} \quad \text{E} \end{array}$$



$$\begin{array}{r} 3. \quad 0 \quad 7 \quad 10 \quad 6 \\ 0 \quad 8 \quad 7 \quad 10 \quad 6 \\ +0 \quad +8 \quad +7 \quad +4 \quad +6 \\ \hline 0 \quad 16 \quad 21 \quad 24 \quad 18 \\ \text{P} \quad \text{A} \quad \text{G} \quad \text{E} \quad \text{S} \end{array}$$

$$\begin{array}{r} 4. \quad 2 \quad 10 \\ 5 \quad 10 \\ +5 \quad +10 \\ \hline 12 \quad 30 \\ \text{T} \quad \text{O} \end{array}$$

$$\begin{array}{r} 5. \quad 6 \quad 6 \\ 9 \quad 6 \quad 6 \\ +9 \quad +12 \quad +6 \\ \hline 18 \quad 24 \quad 24 \\ \text{S} \quad \text{E} \quad \text{E} \end{array}$$

$$\begin{array}{r} 6. \quad 5 \quad 20 \quad 4 \quad 3 \\ 5 \quad 20 \quad 4 \quad 3 \\ +5 \quad +20 \quad +4 \quad +3 \\ \hline 20 \quad 60 \quad 16 \quad 12 \\ \text{W} \quad \text{H} \quad \text{A} \quad \text{T} \end{array}$$

$$\begin{array}{r} 7. \quad 9 \\ 9 \quad 10 \\ +9 \quad +8 \\ \hline 27 \quad 18 \\ \text{I} \quad \text{S} \end{array}$$

$$\begin{array}{r} 8. \quad 5 \quad 2 \\ 5 \quad 15 \quad 2 \\ +5 \quad +15 \quad +2 \\ \hline 15 \quad 30 \quad 8 \\ \text{F} \quad \text{O} \quad \text{R} \end{array}$$

$$\begin{array}{r} 9. \quad 5 \\ 5 \quad 5 \quad 3 \\ 5 \quad 5 \quad 3 \quad 12 \\ +3 \quad +6 \quad +3 \quad +12 \\ \hline 18 \quad 16 \quad 9 \quad 24 \\ \text{S} \quad \text{A} \quad \text{L} \quad \text{E} \end{array}$$



0	P
3	U
6	N
8	R
9	L
12	T
15	F
16	A

18	S
20	W
21	G
24	E
27	I
30	O
60	H

121

## UNIT 7

## PREVIEW

### Suggestions

Ask how many students have been to or have organized a garage sale. Discuss where it is held (hence the name) and why people have them.

Turn to the title page to discuss the things that are for sale in this unit. Explain that Unit 7 is about a "Garage and Bake Sale" that a class of 9-year-olds have organized.

### About the Page

This page reviews repeated addition up to 4 addends. All students should attempt to crack the code.

Write question 1 on the board.

Have the students add and look up the letters for the sums using the code boxes on page 121.

### Reinforcement

Use flash cards to drill the addition doubles  $0 + 0$ ,  $1 + 1$ ,  $2 + 2$ ,  $3 + 3$ ,  $4 + 4$ ...,  $9 + 9$ .

$7 \times 2 = 14$

$25. \quad 2 \times 9 = 18$

$26. \quad 2 \times 5 = 10$

$4 \times 2 = 8$

$28. \quad 8 \times 2 = 16$

$29. \quad 2 \times 2 = 4$

$4 \times 5 = 20$

$31. \quad 5 \times 3 = 15$

$32. \quad 8 \times 5 = 40$

$5 \times 6 = 30$

$34. \quad 5 \times 9 = 45$

$35. \quad 5 \times 2 = 10$

$5 \times 5 = 25$

$37. \quad 7 \times 5 = 35$

$38. \quad 3 \times 3 = 9$

$3 \times 8 = 24$

$40. \quad 3 \times 4 = 12$

$41. \quad 3 \times 9 = 27$

$3 \times 5 = 15$

$43. \quad 6 \times 3 = 18$

$44. \quad 3 \times 7 = 21$

$2 \times 3 = 6$

$46. \quad 4 \times 5 = 20$

$47. \quad 4 \times 3 = 12$

$4 \times 9 = 36$

$49. \quad 7 \times 4 = 28$

$50. \quad 4 \times 4 = 16$

$2 \times 4 = 8$

$52. \quad 6 \times 4 = 24$

$53. \quad 4 \times 8 = 32$

## Objective N8

Skip count by 2s, 3s, and 4s to 50 and by 5s and 10s to 100.

## Introducing the Lesson

Ask the students to close their eyes and skip count aloud by 10s to 100 and by 5s to 100.

Introduce the Hundreds Chart (hang it on the wall for easy reference). Follow skip counting by 10s on the chart. Ask what pattern skip counting by 10s makes (single vertical line). Use the vocabulary the students come up with to describe the pattern.

Do the same for skip counting by 5s. The pattern is 2 vertical lines.

## Teaching the Lesson

Have various students read aloud what is for sale on page 122. Direct them to point to the cards in each successive group saying:

softly one, two	loudly <b>three</b>
four, five	<b>six</b>
seven, eight	<b>nine</b>
•	•
•	•
•	•
nineteen, twenty	<b>twenty-one</b>

Refer to the top row of the table on page 122 to count aloud by 3s to 21. Explain that the bottom row of the table shows the cost of the baseball cards.

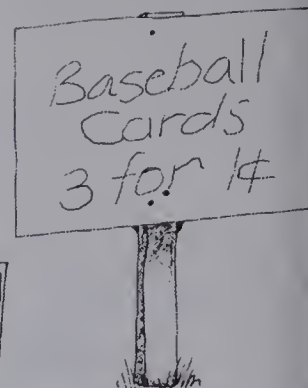
Count by 3s to 50 on the hundreds chart. Ask for the pattern it makes.

Count by 2s to 50 and 4s to 50 on the hundreds chart. Discuss the pattern each one makes.

# Skip Counting

How many baseball cards does 7¢ buy?

To find out, count by threes.



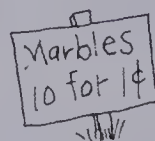
3	6	9	12	15	18	21
1¢	2¢	3¢	4¢	5¢	6¢	7¢

7¢ buys 21 cards.

## EXERCISES

Copy and complete the charts.

1.



10	20	30	40	50	60
1¢	2¢	3¢	4¢	5¢	6¢

2.



2	4	6	8	10	12
1¢	2¢	3¢	4¢	5¢	6¢

Add.

3.  $4 + 4 = 8$  4.  $8 + 4 = 12$  5.  $12 + 4 = 16$  6.  $16 + 4 = 20$   
 7.  $3 + 3 = 6$  8.  $6 + 3 = 9$  9.  $9 + 3 = 12$  10.  $12 + 3 = 15$

Copy and complete the charts.

11.

	1	2	3	4	5	6
wheels	4	8	12	16	20	24

12.

	1	2	3	4	5	6
legs	3	6	9	12	15	18

13.

	1	2	3	4	5	6
ears	2	4	6	8	10	12

14.

	1	2	3	4	5	6
fingers	5	10	15	20	25	30

## Using the Exercises

- Questions 1 and 2 require skip counting by 10s and 2s to complete charts similar to the one in the lesson example.
- Questions 3 to 10 ask students to count on by 3 and 4 to develop the skip counting sequences for 3 and 4.
- Questions 11 to 14 have students write the skip counting sequences for 2, 3, 4, and 5. Students should copy each table into their notebooks.



## PRACTICE

Copy this chart.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

- Count by twos. Mark the boxes with a red line.  
How many marks did you make? 25 boxes marked.
- Count by fours. Mark the boxes with a blue line.  
How many marks did you make? 12 boxes marked.
- Count by threes. Mark the boxes with a green line.  
How many marks did you make? 16 boxes marked.



Complete the patterns. Use your chart.

- 2, 4, 6, 8, 10, 12, 14
- 11, 12, 13, 14, 15, 16
- 3, 6, 9, 12, 15, 18, 21
- 40, 50, 60, 70, 80, 90, 100
- 5, 10, 15, 20, 25, 30, 35
- 4, 8, 12, 16, 20, 24, 28

- Name the boxes that have all three marks. There are four.  
12, 24, 36, 48

### Who am I?

I'm not so very large,  
Just over 53.  
Keep counting by fives.  
My name you soon will see.  
Who am I? 55

Counting by sixes,  
But not past 22,  
I'm a little past 16.  
So who am I to you? 18

123

## Assigning the Practice

Minimum: 1-5

Average: 1-10

Enriched: 1-10

## Reinforcement

1. Before assigning *Who am I?* at the bottom of page 123, try several similar riddles with the students.

Counting by fours,  
But not past 33,  
When you go past 30  
My name you will see.

Encourage the students to devise their own counting riddles. Display them for the others to solve.

2. Have 10 students form a circle and answer the following questions about their group round-robin style.

- How many eyes? (Count by 2s.)  
How many fingers? (Count by 5s.)  
How many ears (Count by 3s.)  
and noses?  
How many limbs? (Count by 4s.)

3. Have several students trace and cut 10 train cars apiece. Each student writes on the cars the numbers for one of the counting sequences (2s, 3s, 4s, 5s, or 10s).



Colour code each set of trains.

Mix the trains up and have the students put each set in order from smallest to largest.

## Enrichment

1. Extend the chart on page 123 to 100 and answer questions 1, 2, 3, and 10 on page 123. (Use the master provided in this book.)

2. Play "Bang". Seat 5 to 10 students in a circle. Have a student begin counting aloud from 1. Pass around a bean bag or some object as each student counts. If the rule of the game is to count by 3s, then the students whose turn it is to say "three", "six", etc. must say "bang" instead. Continue counting to 50. When a student forgets to say "bang" or says the wrong number, the game starts over with that student saying "one".

### Extra Practice

Complete the patterns

3, 6, 9, 12, 15, 18

2, 4, 6, 8, 10, 12

4, 8, 12, 16, 20, 24

35, 40, 45, 50, 55, 60

20, 30, 40, 50, 60, 70

2, 4, 6, 8, 10, 12, 14, 16

3, 6, 9, 12, 15, 18, 21, 24

4, 8, 12, 16, 20, 24, 28, 32

15, 20, 25, 30, 35, 40, 45, 50

30, 40, 50, 60, 70, 80, 90, 100

### Worksheet N8

Pages 122-123

## Objective A22

Relate multiplication to addition for products to 21 in horizontal form.

## Introducing the Lesson

Write  $7 + 3 + 8 = \square$  on the chalkboard. Have a student model the **equation** with cookies (or counters) to find the answer. Ask for different equations for the same sum. Write the suggestions on the chalkboard. Accept both equal and unequal groups, as well as two or more addends.

$$4 + 5 + 3 + 6 = 18$$

$$3 + 3 + 3 + 3 + 3 + 3 = 18$$

## Teaching the Lesson

Have a student read aloud what is for sale on page 124. Ask what the picture means. Explain that "3 groups of 6" is the long way of telling its meaning and that "3 sixes" is the short way. Point out that multiplying is a special kind of adding where the groups are all the same size. Emphasize that "x" is read as "times".

Arrange 12 cookies into 3 equal groups of 4. Ask students:

- for the meaning—both long and short,
- for the addition sentence,
- for the multiplication sentence,
- to read the number sentences.

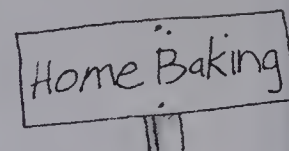
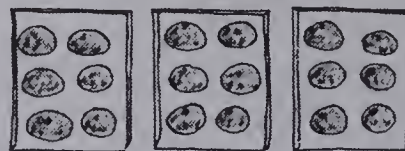
Emphasize the importance of equal-sized groups to multiply. Otherwise you must add each group separately as in the introductory example.

Follow the same procedure for 3 groups of 7 cookies.

Use pennies, centimetre cubes or small tiles on the overhead to illustrate the relationship between repeated addition and multiplication. Students should be encouraged to manipulate objects on the overhead as well as at their desks.

# Addition and Multiplication

How many cookies?



There are: 3 groups of 6 cookies

You may **add**:  $6 + 6 + 6 = 18$

Or: 3 sixes = 18

You may **multiply**:  $3 \times 6 = 18$

You read this as: **Three times six equals eighteen.**

There are 18 cookies.

## EXERCISES

Copy and complete each equation.



4 groups of 3 brownies

$3 + 3 + 3 + 3 = \blacksquare 12$

$4 \text{ threes} = \blacksquare 12$

$4 \times 3 = \blacksquare 12$



2 groups of 5 cupcakes

$5 + 5 = \blacksquare 10$

$2 \text{ fives} = \blacksquare 10$

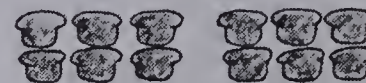
$2 \times 5 = \blacksquare 10$



$2 + 2 + 2 + 2 = \blacksquare 8$

$4 \text{ twos} = \blacksquare 8$

$4 \times 2 = \blacksquare 8$



$6 + 6 = \blacksquare 12$

$2 \text{ sixes} = \blacksquare 12$

$2 \times 6 = \blacksquare 12$



$1 + 1 + 1 = \blacksquare 3$

$3 \text{ ones} = \blacksquare 3$

$3 \times 1 = \blacksquare 3$



$0 + 0 + 0 = \blacksquare 0$

$3 \text{ zeros} = \blacksquare 0$

$3 \times 0 = \blacksquare 0$

## Using the Exercises

- Questions 1 and 2 carefully develop the multiplication equation by beginning with a word description of the picture.
- Questions 3 to 6 start with the addition equation represented by the picture and develop the multiplication equation. Note that multiplying by zero is used in question 6.



## PRACTICE





Copy and complete.

1. 5 groups of 2  
 $2 + 2 + 2 + 2 + 2 = \blacksquare 10$   
 $5 \times 2 = \blacksquare 10$
2. 4 groups of 4  
 $\blacksquare 4 + \blacksquare 4 + \blacksquare 4 + \blacksquare 4 = 16$   
 $\blacksquare 4 \times 4 = 16$
3. 3 groups of 5  
 $5 + 5 + 5 = \blacksquare 15$   
 $3 \times \blacksquare 5 = 15$
4. 6 threes  
 $3 + 3 + 3 + 3 + 3 + 3 = \blacksquare 18$   
 $6 \times 3 = \blacksquare 18$
5. 4 threes  
 $\blacksquare 3 + \blacksquare 3 + \blacksquare 3 + \blacksquare 3 = 12$   
 $\blacksquare 4 \times 3 = 12$
6. 5 ones  
 $1 + 1 + 1 + 1 + 1 = \blacksquare 5$   
 $\blacksquare 5 \times \blacksquare 1 = 5$
7.  $0 + 0 + 0 = \blacksquare 0$   
 $\blacksquare 3 \times 0 = \blacksquare$
8.  $5 + 5 = \blacksquare 10$   
 $2 \times \blacksquare 5 = 10$
9.  $3 + 3 + 3 = \blacksquare 9$   
 $\blacksquare 3 \times \blacksquare 3 = 9$
10. 9 twos =  $\blacksquare 18$   
 $\blacksquare 9 \times \blacksquare 2 = 18$
11. 3 fours =  $\blacksquare 12$   
 $\blacksquare 3 \times \blacksquare 4 = 12$
12. 2 sevens =  $\blacksquare 14$   
 $\blacksquare 2 \times \blacksquare 7 = 14$

Multiply.

13.  $2 \times 9$  18
14.  $3 \times 2$  6
15.  $3 \times 4$  12
16.  $4 \times 5$  20
17.  $2 \times 5$  10
18.  $4 \times 4$  16

Solve.

19. 6 children have  
3  each.  
How many  in all? 18
20. 4 plates with  
5  on each  
How many  in all? 20

## MATHFUN



125

## Assigning the Practice

Minimum: odd numbers

Average: 1-20

Enriched: 1-20

Allow students to use counters or to draw groups, if needed, particularly for questions 13 to 20.

## Reinforcement

1. Have the students work in pairs with 21 counters. One student arranges 21 or fewer counters into equal-sized groups. The other student tells the meaning and writes the related addition and multiplication sentences. The children take turns arranging and writing.

2. Prepare cards like the following.

9 twos

3 fours

2 sevens

Have students model one card with counters and then write the related addition and multiplication sentences to find the answer. They then exchange cards and repeat.

## Enrichment

1. Assign *MATHFUN* on page 125. This is a kind of flow chart. Students start with 3 and perform the indicated operation at each step.

2. Make up 2 different coloured decks of cards as shown.

Colour 1

$2 + 2 + 2$

$7 + 7$

$4 + 4 + 4$

$1 + 1 + 1 + 1$

Colour 2

$3 \times 2$

$2 \times 7$

$3 \times 4$

$4 \times 1$

Have students race each other to match the 2 decks of cards. The winner is the person with the most pairs, who can also answer each pair.

Variations: Play "Snap".

Play "Concentration".

Play "Fish".

## Extra Practice

## Worksheet A22

Pages 124-125

1.  $5 + 5 + 5 + 5 =$  20  
4 fives = 20
2. 2 fours = 8  
 $2 \times 4 =$  8
3.  $2 + 2 + 2 =$  6  
 $3 \times$  2 = 6
4.  $3 + 3 + 3 + 3 =$  12  
4  $\times 3 = 12$
5.  $7 + 7 =$  14  
 $2 \times 7 =$  14
6.  $4 \times 2 =$  8
7.  $2 + 2 + 2 + 2 =$  8
8.  $8 + 8 =$  16  
 $2 \times 8 =$  16

8 children ate 2 cookies each.

How many cookies were eaten? 16

3 children bought 7 tarts each.

How many tarts did they buy? 21

## Objective A23

Understand the order property for multiplication with products to 21 in horizontal form.

### Introducing the Lesson

Write the following number sentences on the chalkboard.

$$2 + 2 + 2 + 2 = \underline{\quad}$$

$$3 + 3 + 3 = \underline{\quad}$$

$$4 + 4 + 4 = \underline{\quad}$$

Ask for and write the related multiplication sentence and answer beside each example.

### Teaching the Lesson

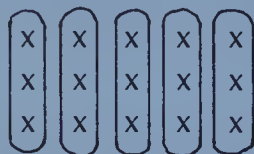
Arrange 15 counters in an array. Draw them on the board and circle groups of 5 as shown.

(Note: If using magnetic counters, place them on the board and circle.)



Ask, "How many groups? How many are in each group? How many are there in all?" Write the multiplication sentence ( $3 \times 5 = 15$ ) underneath the drawing. Do not erase this drawing.

Draw the same array on the board beside the drawing. Circle groups of 3 as shown.



Ask, "Has the number of counters changed? How are the two drawings different? How many groups? How many are in each group? How many are there in all?" Write the multiplication sentence ( $5 \times 3 = 15$ ) underneath the drawing.

Turn to page 126. Point out that one picture shows 2 groups of 4 and the other shows 4 groups of 2. Explain that multiplication can be thought of in two ways without changing the total. This is called the **order property** for multiplication. Ask if addition or subtraction has an order property.

## Order in Multiplication

You can think of 8 in two ways.

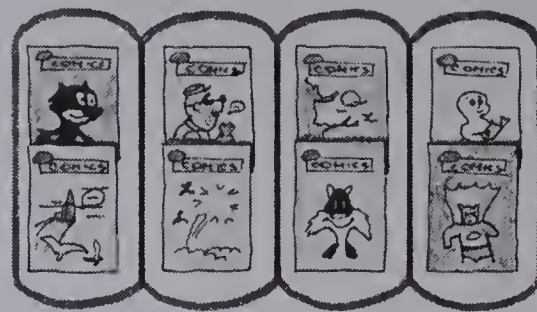


2 groups of 4

2 fours = 8

$$2 \times 4 = 8$$

factor factor product



4 groups of 2

4 twos = 8

$$4 \times 2 = 8$$

factor factor product

or

The **product** is the same both ways.

The order of the factors doesn't change the product.

### EXERCISES

Copy and complete each equation.



$$2 \times 3 = \blacksquare 6$$



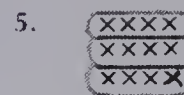
$$3 \times 2 = \blacksquare 6$$



$$3 \times \blacksquare 5 = 15$$



$$5 \times \blacksquare 3 = 15$$



$$3 \times \blacksquare 4 = 12$$



$$4 \times \blacksquare 3 = 12$$

7. 2 threes =  $\blacksquare 3$  twos

8. 3 fives =  $\blacksquare 5$  threes

9.  $1 \times 4 = 4 \times \blacksquare 1$

10.  $3 \times \blacksquare 4 = 4 \times 3$

### Using the Exercises

- Explain the vocabulary of factor (number to be multiplied) and product (answer in multiplying).
- Questions 1 to 6 give a picture to help find the missing factor or product.
- Questions 7 to 10 emphasize the order property of multiplication.



## PRACTICE

Copy each question. Put the correct numerals in the blanks.

1.  $2 \times 9 = 9 \times \blacksquare$  2
2.  $7 \times 2 = \blacksquare \times 7$
3.  $2 \times 10 = \blacksquare \times 2$
4.  $2 \times 0 = 0 \times \blacksquare$  2
5.  $1 \times 4 = \blacksquare \times 1$
6.  $4 \times 3 = 3 \times \blacksquare$  4
7. 2 fives =  $\blacksquare$  10
8. 5 twos =  $\blacksquare$  10
9. 6 ones =  $\blacksquare$  6
10. 1 six =  $\blacksquare$  6
11. 7 zeroes =  $\blacksquare$  0
12. 0 sevens =  $\blacksquare$  0

Multiply.

13.  $2 \times 6$  12
14.  $6 \times 2$  12
15.  $3 \times 4$  12
16.  $4 \times 3$  12
17.  $2 \times 2$  4
18.  $4 \times 5$  20
19.  $5 \times 4$  20
20.  $3 \times 3$  9
21.  $2 \times 5$  10
22.  $5 \times 2$  10
23.  $4 \times 4$  16
24.  $1 \times 1$  1

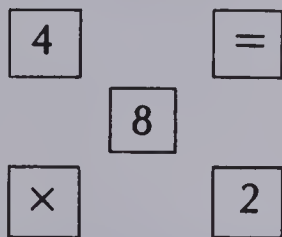
Solve.

25. 4 rows  
2 books in each row  
How many books in all?  
Draw a picture. 8 books
26. 2 boxes  
4 magazines in each box  
How many magazines?  
Draw a picture. 8 magazines

## MATHFUN

Make cards like these.

Arrange them in two ways  
to show multiplication facts.



$$4 \times 2 = 8$$

$$2 \times 4 = 8$$

127

## Extra Practice

## Worksheet A23

Pages 126-127

1. 4 fives = 20
2.  $4 \times 5 =$  20
3. 5 fours = 20
4.  $5 \times 4 =$  20
5.  $2 \times 4 =$  8
6.  $4 \times 2 =$  8
7.  $2 \times 8 =$  16
8.  $8 \times 2 =$  16
9.  $1 \times 3 =$  3
10.  $3 \times 1 =$  3
11.  $3 \times 5 = 5 \times$  3
12.  $2 \times 6 =$  6  $\times 2$

ve

2 boxes with 6 pencils in each box. How many pencils in all? 12  
Draw a picture.

6 bags with 2 marbles in each bag. How many marbles in all? 12  
Draw a picture.

## Assigning the Practice

Minimum: odd numbers

Average: 1-26

Enriched: 1-26

## Reinforcement

1. Assign *MATHFUN* on page 127.

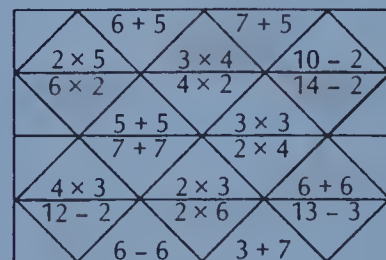
Other examples may be given to be sure students understand the difference between factors and products and that they use the order property correctly.

2. Play "Snap". Prepare playing cards by writing the pairs of multiplication facts to 21, e.g.,  $7 \times 3$ ,  $3 \times 7$ . Play begins between two players. Deal all the cards. Both players must turn up one of their cards simultaneously. If they happen to be a matching pair, the player to first say "snap" wins the right to find the product (using counters, if necessary). If correct, the player keeps the 2 cards. If incorrect, the other player can find the answer and keep the cards. The winner is the player with the most cards when at least one of the players has exhausted half of the deck.

3. Play "Fish". Use the cards from "Snap". Place the cards face down on the floor or table. Two to four players may play. Each player, in turn, turns 2 cards face up. If they match, the player must tell the product (allow counters to be used). If correct, the player keeps the cards. If incorrect, the cards are turned over in the same place and the next player gets a turn. The winner is the player with the most pairs.

## Enrichment

1. Colour all names for 12. What picture do you find?



2. Encourage the students to make up story problems similar to those on page 127. Display them around the room for the other students to draw the appropriate pictures.

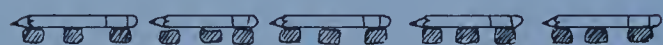
**Objective PS11**

Choose the correct operation in solving a word problem.

**Introducing the Lesson**

Display 5 objects of one kind and 3 objects of another (e.g., pencils and erasers). Guide the students in composing three word problems requiring multiplication, addition, and subtraction, as follows: Write *multiplication* on the chalkboard. Say, "Let's think of a multiplication story problem that mentions 5 pencils and 3 erasers." To assist them, illustrate a situation with materials.

Example:



*There were 5 pencils on a table. Each pencil sat on top of 3 erasers. How many erasers were there?*

Repeat this developmental discussion using 4 paint sets and 3 brushes.

**Teaching the Lesson**

Have the students practise the words addition, subtraction, and multiplication (pronounce, syllabify, spell).

Explain how you wish the problems on page 128 recorded. Make up several examples to practise.

**Reinforcement**

Supply each student with several index cards. On the front of each, have the student compose a word problem using the format on page 128. On the back require an illustration and an equation.

**Enrichment**

For a game requiring dice, construct word problem dice. On each of the six sides of a large cube (e.g., a cardboard litre cube) glue a word problem to be solved before a move is made.

# Operations: $+$ $-$ $\times$

addition subtraction multiplication

First pick the **operation**. Then find the answer.

- 15 dolls are for sale. 7 have caps. How many don't?  
a.  $15 + 7$       b.  $15 - 7 = 8$       c.  $15 \times 7$
- 5 boxes. Each holds 4 toys. How many toys in all?  
a.  $5 + 4$       b.  $5 - 4$       c.  $5 \times 4 = 20$
- 3 bears in each bag. 2 bags. How many teddy bears?  
a.  $3 + 2$       b.  $3 - 2$       c.  $2 \times 3 = 6$
- 6 short pencils. 2 long pencils. How many in all?  
a.  $6 + 2 = 8$       b.  $6 - 2$       c.  $2 \times 6$
- 9 cases. Each holds 2 bottles. How many bottles in all?  
a. addition      b. subtraction      c. multiplication  
 $9 \times 2 = 18$
- 62 marbles in a jar. 59 marbles in a bag. How many altogether?  
a. addition  
 $62 + 59 = 121$       b. subtraction      c. multiplication
- 8 tables to start. 2 are taken. How many are left?  
a. addition      b. subtraction  
 $8 - 2 = 6$       c. multiplication
- A batch of brownies is cut into 5 rows and 3 columns. How many brownies in this batch?  
a. addition      b. subtraction      c. multiplication  
 $5 \times 3 = 15$

128

**Problem Solving Activities**

Assign Level 3, Unit 7.



Draw a picture first. Then give the equation.

2 pans of cookies  
3 gum drops on each cookie  
4 cookies on each pan

6 slices from each loaf  
3 loaves in all.  
4 nuts in each slice

1. How many cookies altogether? **8**

2. How many slices in all? **18**

7 marbles in each bag  
3 bags in each box  
2 boxes in all

5¢ spent by each child  
6 groups of children  
4 kids in each group

3. How many marbles in each box? **42**

4. How many kids in all? **24**

## REVIEW

Copy and complete the patterns.

1. 3, 6, 9, **12**, **15**    2. 2, 4, 6, **8**, **10**    3. 4, 8, 12, **16**, **20**  
4. 5, 10, 15, **20**, **25**    5. 10, 20, 30, **40**, **50**    6. 10, 12, 14, **16**, **18**

Write the answers.

7.  $3 + 3 + 3$  **9**    8.  $3 \times 3$  **9**    9.  $4 + 4$  **8**  
10.  $2 \times 4$  **8**    11. 2 threes **6**    12.  $2 \times 3$  **6**  
13. 4 fives **20**    14.  $4 \times 5$  **20**    15. 5 zeros **0**

Multiply

16.  $3 \times 4$  **12**    17.  $4 \times 3$  **12**    18.  $5 \times 5$  **25**  
19.  $3 \times 5$  **15**    20.  $5 \times 3$  **15**    21.  $4 \times 1$  **4**

129

## Objective PS12

Use relevant information in solving a word problem.

## Introducing the Lesson

As a group, draw pictures of the following situations.

- 3 pans of cookies
- 4 chocolate chips on each cookie
- 5 cookies on each pan
- 10¢ spent by each child
- 3 children in each group
- 2 groups of children
- a 2-page math worksheet
- 5 problems on each page
- 6 children in the math group

## Teaching the Lesson

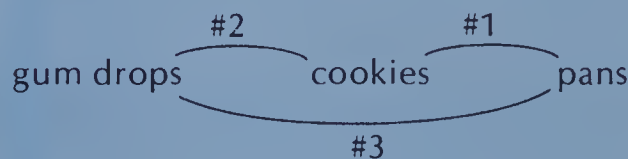
For each question choose the appropriate picture, decide if any information is extra and solve the problem with an equation.

- How many problems are on each worksheet?
- How many chocolate chips are needed in all?
- How much money does each group spend?
- How many problems must the teacher check?
- How many cookies are there in all?
- How much money is spent in all?

## Enrichment

For each of the problems on page 129, at least three arithmetic questions can be asked. After drawing the pictures, have a student write three arithmetic questions for problems from the lesson.

- How many cookies in all?
- How many gum drops on each pan?
- How many gum drops in all?



## Review Exercises

Questions	Objective	Pages
1-6	N8	122-123
7-15	A22	124-125
16-21	A23	126-127

## Extra Practice

## Worksheet PS11-PS12

Pages 128-129

Check the operation. Then solve the problem.

7 apples. 5¢ each. How much in all?

- a.  $7 + 5$     b.  $7 - 5$     c.  $7 \times 5 = 35$

38 children. 7 are absent. How many are present?

- a.  $38 + 7$     b.  $38 - 7 = 31$     c.  $38 \times 7$

10 boys. 8 girls. How many children?

- a.  $10 + 8 = 18$     b.  $10 - 8$     c.  $10 \times 8$

6 marbles in each bag. 4 bags in each box. 3 boxes in all.  
How many bags in all?

- a.  $6 \times 4$     b.  $4 \times 3 = 12$     c.  $3 \times 6$

## Objective A24

Multiply with 2 as a factor in products to 18.

## Introducing the Lesson

Have students close their eyes and count aloud by 2s to 18. Ask 5 students to stand in front of the class. Starting from the left, have the students in turn hold up 2 fingers of their left hands, then 2 fingers of their right hands. As each hand goes up ask, "How many 2s?" 1 two, 2 twos, 3 twos. "How many fingers in all?" 2, 4, 6,...

When all fingers are up, count by 2s from the beginning.

Refer to the hundreds chart to continue counting by 2s to 50 and to review the pattern it makes (from Lesson 1).

## Teaching the Lesson

Direct students to the top of page 130. The picture shows 9 pairs of footwear, or 9 twos. To find how many in all, count by 2s.

Remind students that changing the order of the factors does not affect the product. Therefore,  $9 \times 2$  can also be  $2 \times 9$ .

Draw 18 crosses on the board as shown and have a student come up and circle the crosses to show the meaning of  $2 \times 9$ .

XXXXXXXXXX

XXXXXXXXXX

Explain that you can add  $9 + 9$  instead of counting by 2s to get 18.

Write  $8 \times 2$  and  $2 \times 8$  on the board. Ask what each one means (8 twos or 2 eights) and what to do to find how many in all (count by 2s or add  $8 + 8$ ).

Draw the following crosses on the board and have a student come up and circle the crosses to show both meanings.

XXXXXX  
XXXXXX

XXXXXXXXXX

XXXXXXXXXX

## Two

How many in all?



You can think of:

$$9 \text{ twos} = 18$$

$$\text{or } 2 \text{ nines} = 18$$

You can add:  $2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 18$

$$\text{or } 9 + 9 = 18$$

You can multiply:

$$9 \times 2 = 18$$

$$\text{or } 2 \times 9 = 18$$

There are 18 in all.

## EXERCISES

Write an equation for each question.

1.  $0 + 0$   $2 \times 0 = 0$
2. 2 zeros  $2 \times 0 = 0$
3.  $2 \times 0 = 0$
4.  $1 + 1$   $2 \times 1 = 2$
5. 2 ones  $2 \times 1 = 2$
6.  $2 \times 1 = 2$
7.  $2 + 2$   $2 \times 2 = 4$
8. 2 twos  $2 \times 2 = 4$
9.  $2 \times 2 = 4$
10.  $2 + 2 + 2$   $3 \times 2 = 6$
11. 3 twos  $3 \times 2 = 6$
12.  $3 \times 2 = 6$
13.  $3 + 3$   $2 \times 3 = 6$
14. 2 threes  $2 \times 3 = 6$
15.  $2 \times 3 = 6$
16.  $2 + 2 + 2 + 2$   $4 \times 2 = 8$
17. 4 twos  $4 \times 2 = 8$
18.  $4 \times 2 = 8$
19.  $4 + 4$   $2 \times 4 = 8$
20. 2 fours  $2 \times 4 = 8$
21.  $2 \times 4 = 8$
22.  $2 + 2 + 2 + 2 + 2$   $5 \times 2 = 10$
23. 5 twos  $5 \times 2 = 10$
24.  $5 \times 2 = 10$
25.  $5 + 5$   $2 \times 5 = 10$
26. 2 fives  $2 \times 5 = 10$
27.  $2 \times 5 = 10$
28.  $2 + 2 + 2 + 2 + 2 + 2$   $6 \times 2 = 12$
29. 6 twos  $6 \times 2 = 12$
30.  $6 \times 2 = 12$
31.  $6 + 6$   $2 \times 6 = 12$
32. 2 sixes  $2 \times 6 = 12$
33.  $2 \times 6 = 12$

## Using the Exercises

- Direct students to answer the questions in numerical order to emphasize the relationship of repeated addition to the meaning of multiplication and the multiplication sentence.









## PRACTICE

Write an equation.

1.  $5 + 5 = 10$
2.  $2 \times 5 = 10$
3.  $6 + 6 = 12$
4.  $2 \times 6 = 12$
5.  $7 + 7 = 14$
6.  $2 \times 7 = 14$
7.  $8 + 8 = 16$
8.  $2 \times 8 = 16$
9.  $9 + 9 = 18$
10.  $2 \times 9 = 18$
11.  $10 + 10 = 20$
12.  $2 \times 10 = 20$
13.  $2 \times 7 = 14$
14.  $7 \times 2 = 14$
15.  $2 \times 1 = 2$
16.  $1 \times 2 = 2$
17.  $2 \times 3 = 6$
18.  $3 \times 2 = 6$
19.  $2 \times 8 = 16$
20.  $8 \times 2 = 16$
21.  $2 \times 0 = 0$
22.  $0 \times 2 = 0$
23.  $2 \times 9 = 18$
24.  $9 \times 2 = 18$
25.  $2 \times 5 = 10$
26.  $5 \times 2 = 10$
27.  $2 \times 4 = 8$
28.  $4 \times 2 = 8$

Solve.

29. 2  How many toes? 20
30. 5  How many hands? 10
31. 2  How many scoops? 6
32. 8  How many wings? 16
33. 2  How many petals? 12
34. 9  How many ears? 18

## Scramble Games

Unscramble the letters to make multiplication words.

1. product DUCTPRO

2. factor T R A C O F

3. equals AQUULSE

4. times M E S I T

5. multiply L Y P I T M U

131

## Assigning the Practice

Minimum: odd numbers

Average: 1-34

Enriched: 1-34

## Reinforcement

1. Provide an egg carton with the lid cut off and 20 beans for each student.

Write a multiplication question on the board and have students build it in the egg carton to find its product. Emphasize the meaning of the question.

$6 \times 2 = 12$

$2 \times 4 = 8$



Have students work in pairs with the egg carton and flash cards for the 2 times table. Include all the facts with 2 as a factor. One player holds the card up. The other reads it and answers it. If unable to answer it, that player is to use the egg carton to solve the fact. The player holding the card checks the answer with the product on the back of the card.

2. Assign *Scramble Games* on page 131. Have the students scramble other math words to be solved by their classmates.

## Enrichment

Find the missing number.

$2 \times \square = 10$

$\square \times 1 = 2$

$2 \times \square = 4$

$\square \times 3 = 6$

$2 \times \square = 18$

$\square \times 2 = 16$

$2 \times \square = 12$

$\square \times 7 = 14$


Have the students make 10 copies of their footprints on paper and cut them out. On the left footprint, write a multiplication fact. On the right footprint, write the products. Jumble the footprints. Time the students as they work to match their footprints.

## Extra Practice

## Worksheet A24

Pages 130-131

1.  $6 + 6 = 12$
2.  $2 \times 6 = 12$
3.  $6 \times 2 = 12$
4.  $7 + 7 = 14$
5.  $2 \times 7 = 14$
6.  $7 \times 2 = 14$
7.  $8 + 8 = 16$
8.  $2 \times 8 = 16$
9.  $8 \times 2 = 16$
10.  $9 + 9 = 18$
11.  $2 \times 9 = 18$
12.  $9 \times 2 = 18$
13.  $2 \times 5 = 10$
14.  $5 \times 2 = 10$
15.  $2 \times 4 = 8$
16.  $4 \times 2 = 8$
17.  $3 \times 2 = 6$
18.  $2 \times 2 = 4$

19. 2  How many wheels? 8

20. 3  How many arms? 6

## Objective A25

Multiply with 5 as a factor in products to 45.

## Introducing the Lesson

Have students close their eyes and count by 5s to 50. Refer to the hundreds chart to count by 5s to 100 and to discuss the pattern it makes.

## Teaching the Lesson

Direct students to the top of page 132. There are 9 gloves. To find how many fingers in all, count by 5s. Explain that 9 fives or  $9 \times 5$  equals 45 fingers in all.

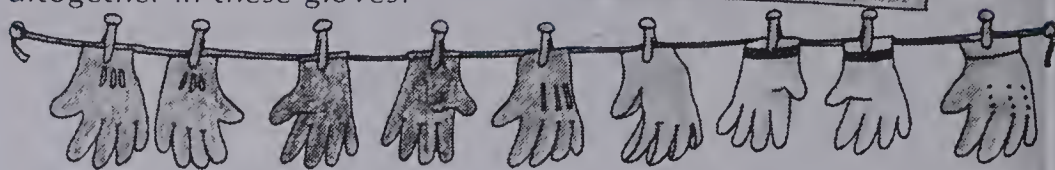
Have students cover up 2 gloves. Ask, "How many gloves are left?" (7.) "How many fives?" (7 fives.) "How many fingers in all?" (35.) "What is the multiplication sentence to show this?" ( $7 \times 5 = 35$ ) "What is another way to write this?" ( $5 \times 7 = 35$ )

Follow the above procedure several more times, covering up different numbers of gloves each time, until students are comfortable solving the 5 times table.

Refer to the multiplication wall chart and fill in the vertical column for the 5 times table by pointing, writing, and saying, "Zero times five equals zero;" "One times five equals 5;" ... "Nine times five equals forty-five." Then fill in the corresponding horizontal row.

## Five

How many fingers are there altogether in these gloves?



To find out, count by fives.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

$$9 \text{ fives} = 45$$

$$9 \times 5 = 45$$

There are 45 fingers in 9 gloves.

## EXERCISES

Write each product.

- 1 five 5
- $1 \times 5$  5
- 2 fives 10
- $2 \times 5$  10
- 3 fives 15
- $3 \times 5$  15
- 4 fives 20
- $4 \times 5$  20
- 5 fives 25
- $5 \times 5$  25
- 6 fives 30
- $6 \times 5$  30
- 7 fives 35
- $7 \times 5$  35
- 8 fives 40
- $8 \times 5$  40
- 9 fives 45
- $9 \times 5$  45
- 0 fives 0
- $0 \times 5$  0

## Using the Exercises

- These questions review the meaning of multiplication with the related multiplication sentence.
- Encourage students to count by 5s to help them find the products.

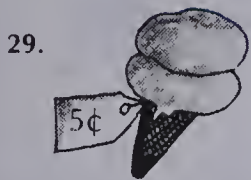


## PRACTICE

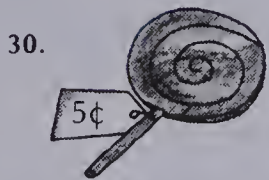
Write the factors and product in an equation.

1.  $0 \times 5 = 0$  2.  $5 \times 0 = 0$  3.  $1 \times 5 = 5$  4.  $5 \times 1 = 5$
5.  $2 \times 5 = 10$  6.  $5 \times 2 = 10$  7.  $3 \times 5 = 15$  8.  $5 \times 3 = 15$
9.  $4 \times 5 = 20$  10.  $5 \times 4 = 20$  11.  $5 \times 5 = 25$  12.  $6 \times 5 = 30$
13.  $5 \times 6 = 30$  14.  $7 \times 5 = 35$  15.  $8 \times 5 = 40$  16.  $5 \times 8 = 40$
17.  $9 \times 5 = 45$  18.  $5 \times 9 = 45$  19.  $5 \times 3 = 15$  20.  $5 \times 7 = 35$
21.  $5 \times 9 = 45$  22.  $4 \times 5 = 20$  23.  $8 \times 5 = 40$  24.  $5 \times 6 = 30$
25.  $5 \times 1 = 5$  26.  $5 \times 2 = 10$  27.  $5 \times 5 = 25$  28.  $5 \times 1 = 5$

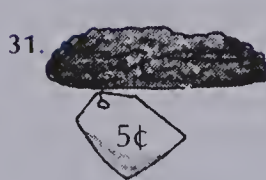
Solve.



How much for  
7 cones? 35¢



How much for  
5 lollipops? 25¢



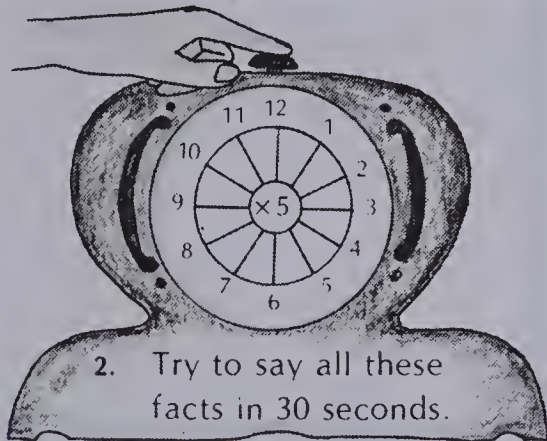
How much for  
8 bars? 40¢

## Beat the Clock

- $1 \times 5 = 5$   
 $2 \times 5 = 10$   
 $3 \times 5 = 15$   
 $\vdots$   
 $11 \times 5 = 55$

1. Finish the pattern.

- $4 \times 5 = 20$   
 $5 \times 5 = 25$   
 $6 \times 5 = 30$   
 $7 \times 5 = 35$   
 $8 \times 5 = 40$   
 $9 \times 5 = 45$   
 $10 \times 5 = 50$



- $1 \times 5 = 5$     $5 \times 5 = 25$     $9 \times 5 = 45$   
 $2 \times 5 = 10$     $6 \times 5 = 30$     $10 \times 5 = 50$   
 $3 \times 5 = 15$     $7 \times 5 = 35$     $11 \times 5 = 55$   
 $4 \times 5 = 20$     $8 \times 5 = 40$     $12 \times 5 = 60$

## Extra Practice

## Worksheet A25

Pages 132-133

- 6 nickels = 30 ¢   2. 9 nickels = 45 ¢   3. 3 nickels = 15 ¢  
 $6 \times 5 =$  30   5.  $9 \times 5 =$  45   6.  $3 \times 5 =$  15  
 $5 \times 6 =$  30   8.  $5 \times 9 =$  45   9.  $5 \times 3 =$  15  
 $7 \times 5 =$  35   11.  $4 \times 5 =$  20   12.  $5 \times 4 =$  20  
 $8 \times 5 =$  40   14.  $5 \times 7 =$  35   15.  $5 \times 5 =$  25

- 5¢   17. 5¢  
 How much are 5 cupcakes?   How much for 8 donuts?  
25¢   40¢

## Assigning the Practice

Minimum: odd numbers

Average: 1-31

Enriched: 1-31

## Reinforcement

1. Provide 9 nickels for each student (real coins or play money). Ask the following questions.

"Show me 3 nickels."

"How many fives?"

"How many cents in all?"

"What is the multiplication sentence?"

"What is another way to write this?"

Vary the number of nickels and repeat the questions.

2. Make several of the following types of cards and cut into 3 parts.

$$5¢ \ 5¢ \ 5¢ \ 5¢ \ 5¢ \ 5¢ \} 6 \times 5 \} 30$$

$$20¢ \ 5¢ \ 5¢ \ 5¢ \ 5¢ \} 4 \times 5$$

Note: In place of nickels "6 fives" and "4 fives" could be used. Have students match the pieces. This can be played individually or in pairs.

## Enrichment

1. Assign *Beat the Clock* on page 133. Have the timer ready to see who can say all of the multiplication facts of 5 in 30 seconds. Try the same with the facts of 2.

2. Combine the 2 and 5 times tables flash cards. Have students time one another with the stop watch to answer all the cards. Keep a record of all the students' times on a chart or graph paper. Repeat several more times to determine individual and class progress.

3. Investigate counting by fives (starting at 100) or by fifties to 1000.

4. Ask the students to find out how many school days there are until a holiday that is 2 to 4 months away. Direct them to use a calendar and count by fives.

5. Distribute a worksheet with problems having missing factors.

- $\blacksquare \times 5 = 10$     $\blacksquare \times 5 = 25$     $\blacksquare \times 5 = 35$   
 $\blacksquare \times 9 = 45$     $\blacksquare \times 3 = 15$     $\blacksquare \times 8 = 40$

## Objective A26

Multiply with 3 as a factor in products to 27.

## Introducing the Lesson

Have students close their eyes and count aloud by 3s to 30. Refer to the hundreds chart from Lesson 1 to count by 3s to 50 and to discuss the pattern it makes.

## Teaching the Lesson

Direct students to the top of page 134. There are 9 stools pictured. To find how many legs in all, count by 3s. Use the chart shown. Explain that 9 threes or  $9 \times 3$  equals 27 legs in all. Have students cover up one stool. Ask:

- “How many stools are left?” (8.)
- “How many threes?” (8 threes.)
- “How many legs in all? Count by 3s to help you.” (24.)
- “What is the multiplication sentence?” ( $8 \times 3 = 24$ )
- “What is another way to write this?” ( $3 \times 8 = 24$ )

Follow this same procedure covering up a different number of stools each time until the students are comfortable solving the 3 times table. Fill in the multiplication wall chart for the 3 times table. Complete the vertical column first, then fill in the corresponding horizontal row. Emphasize the ones already filled in ( $2 \times 3$ ,  $5 \times 3$ ,  $3 \times 2$ , and  $3 \times 5$ ).

## Three



How many legs in all?

To find out, count by threes.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

$$9 \text{ threes} = 27$$

$$9 \times 3 = 27$$

There are 27 legs.

## EXERCISES

Write each product.

- 1 three 3
- $1 \times 3$  3
- 2 threes 6
- $2 \times 3$  6
- 3 threes 9
- $3 \times 3$  9
- 4 threes 12
- $4 \times 3$  12
- 5 threes 15
- $5 \times 3$  15
- 6 threes 18
- $6 \times 3$  18
- 7 threes 21
- $7 \times 3$  21
- 8 threes 24
- $8 \times 3$  24
- 9 threes 27
- $9 \times 3$  27
- 0 threes 0
- $0 \times 3$  0

## Using the Exercises

- These questions review the meaning of multiplication with the related multiplication sentence.
- Encourage students to count by 3s to solve.

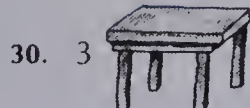


## PRACTICE

Write the product in an equation.

1.  $0 \times 3 = 0$  2.  $3 \times 0 = 0$  3.  $1 \times 3 = 3$  4.  $3 \times 1 = 3$
5.  $2 \times 3 = 6$  6.  $3 \times 2 = 6$  7.  $3 \times 3 = 9$  8.  $4 \times 3 = 12$
9.  $3 \times 4 = 12$  10.  $5 \times 3 = 15$  11.  $3 \times 5 = 15$  12.  $6 \times 3 = 18$
13.  $3 \times 6 = 18$  14.  $7 \times 3 = 21$  15.  $3 \times 7 = 21$  16.  $8 \times 3 = 24$
17.  $3 \times 8 = 24$  18.  $9 \times 3 = 27$  19.  $3 \times 9 = 27$  20.  $7 \times 2 = 14$
21.  $7 \times 3 = 21$  22.  $7 \times 5 = 35$  23.  $4 \times 3 = 12$  24.  $3 \times 9 = 27$
25.  $6 \times 2 = 12$  26.  $6 \times 3 = 18$  27.  $6 \times 5 = 30$  28.  $3 \times 1 = 3$


Solve.



How many legs? 21 How many legs? 12 How many legs? 24

## Who am I?

1.   $\times 2 = 6$   
3

  $\times 4 = 12$   
3

2. Multiply me by any number.  
The product is always zero.  
Who am I? 0

3. Multiply any number by me.  
The product is always the  
other number.  
Who am I? 1

$0 \times 5 = 0$   $0 \times 1 = 0$   
 $0 \times 3 = 0$   $\square \times 0 = 0$   
↑  
any number

$1 \times 5 = 5$   $1 \times 2 = 2$   
 $1 \times 3 = 3$   $1 \times 1 = 1$   
↑  
any number 135

## Extra Practice

Multiply.

1.  $4 \times 3 = 12$  2.  $1 \times 3 = 3$  3.  $3 \times 3 = 9$
4.  $3 \times 4 = 12$  5.  $3 \times 1 = 3$  6.  $5 \times 3 = 15$
7.  $8 \times 3 = 24$  8.  $6 \times 3 = 18$  9.  $3 \times 2 = 6$
10.  $3 \times 6 = 18$  11.  $9 \times 3 = 27$  12.  $3 \times 8 = 24$

How many wheels?

- 6 tricycles 18  
8 tricycles 24  
4 tricycles 12

## Worksheet A26

Pages 134-135

## Assigning the Practice

Minimum: odd numbers

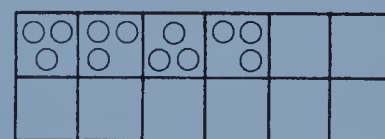
Average: 1-31

Enriched: 1-31

## Reinforcement

1. Provide an egg carton with the lid cut off and 30 beans for each student. Write a multiplication fact on the board and have students build it to find its product. Encourage counting by 3s.

$4 \times 3$



Note: Use only facts with 3 as the second factor ( $7 \times 3$  not  $3 \times 7$ ) to encourage counting by 3s.

2. Prepare cards like the following.

1 three 2 threes 3 threes ... 9 threes

Have a student choose a card, build what it says using the egg carton and beans, then find the total. Students may also be asked to write the related multiplication sentence.

## Enrichment

1. Play *Who Am I?* with the students. Begin by having them guess a few of your examples.

"Multiply me by 3 and you get 21.  
Who am I?"

Then have the students take turns guessing and making up the examples.

Assign *Who Am I?* on page 135. After the missing factors are found, stress:  
a. any number times zero is zero.  $2 \times 0$ ,  $8 \times 0$ ,  $100 \times 0$ ,  $579 \times 0$   
b. any number times one is itself.  $2 \times 1$ ,  $10 \times 1$ ,  $150 \times 1$ ,  $872 \times 1$

2. Circle the names for 8.

$2 \times 4$   $2 + 4$   $4 \times 2$   
 $0 + 8$   $16 - 8$   $14 - 6$

Circle the names for 18.

$6 \times 3$   $2 \times 9$   $9 \times 2$   
 $3 \times 5$   $2 \times 6$   $3 \times 6$

## Objective A27

Multiply with 4 as a factor in products to 36.

## Introducing the Lesson

Have a short oral drill of the 2 times table by asking how much is 2 fours? 2 zeros? 2 sixes? ... 2 nines?

## Teaching the Lesson

Arrange 24 pennies on the overhead projector as shown (or use 24 magnetic counters on the chalkboard).

$$4 \times 6 \quad \begin{array}{cccccc} \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array}$$

Here are 4 groups of 6 pennies. To find how many altogether you can:

- count by ones
- count by fours
- count by sixes
- think of 2 sixes and 2 sixes or 12 and 12.

As each method is discussed, demonstrate it with the pennies. For method **d**, circle and write the following when demonstrating.

$$\begin{array}{l} \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \\ \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \\ \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \\ \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \end{array} \quad \begin{array}{l} 2 \text{ sixes} = 12 \\ \quad \quad \quad + \quad 24 \\ 2 \text{ sixes} = 12 \end{array}$$

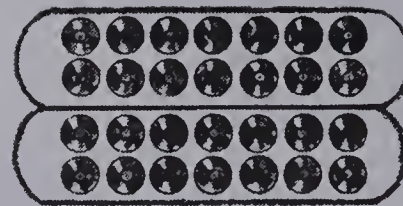
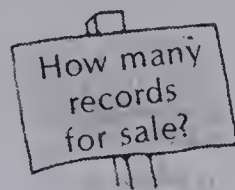
Whatever the method used,  $4 \times 6 = 24$ .

Follow the same procedure for 4 groups of 7 pennies, 4 groups of 8 pennies, and 4 groups of 9 pennies.

Fill in the multiplication wall chart for the 4 times table. Complete the horizontal row first. Emphasize the ones already filled in ( $4 \times 2$ ,  $4 \times 3$ ,  $4 \times 5$ ), then fill in the vertical column.

Direct the students to page 136. Work through the display model.

## Four



2 sevens  
2 sevens  
4 sevens

$$2 \text{ sevens} + 2 \text{ sevens} = 4 \text{ sevens}$$

$$14 + 14 = 28$$

So  $4 \times 7 = 28$

There are 28 records in all.

## EXERCISES

Copy and complete the equations.

- $\begin{array}{l} \times \times \times \times \\ \times \times \times \times \\ \times \times \times \times \\ \times \times \times \times \end{array}$ 
 $2 \text{ fours} = 8$   
 $2 \text{ fours} = 8$   
 $4 \text{ fours} = 16$   
 $4 \times 4 = 16$
- $\begin{array}{l} \times \times \times \times \times \\ \times \times \times \times \times \\ \times \times \times \times \times \\ \times \times \times \times \times \end{array}$ 
 $2 \text{ fives} = 10$   
 $2 \text{ fives} = 10$   
 $4 \text{ fives} = 20$   
 $4 \times 5 = 20$
- $\begin{array}{l} \times \times \times \times \times \times \\ \times \times \times \times \times \times \\ \times \times \times \times \times \times \\ \times \times \times \times \times \times \end{array}$ 
 $2 \text{ sixes} = 12$   
 $2 \text{ sixes} = 12$   
 $4 \text{ sixes} = 24$   
 $4 \times 6 = 24$
- $\begin{array}{l} \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \end{array}$ 
 $2 \text{ sevens} = 14$   
 $2 \text{ sevens} = 14$   
 $4 \text{ sevens} = 28$   
 $4 \times 7 = 28$
- $\begin{array}{l} \times \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \times \end{array}$ 
 $2 \text{ eights} = 16$   
 $2 \text{ eights} = 16$   
 $4 \text{ eights} = 32$   
 $4 \times 8 = 32$
- $\begin{array}{l} \times \times \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \times \times \\ \times \times \times \times \times \times \times \times \times \end{array}$ 
 $2 \text{ nines} = 18$   
 $2 \text{ nines} = 18$   
 $4 \text{ nines} = 36$   
 $4 \times 9 = 36$

## Using the Exercises

- These exercises provide practice of the more difficult 4 times table using the distributive property of multiplication over addition which was introduced as method **d** in Teaching the Lesson.







## PRACTICE

Multiply.

1.  $4 \times 0$  0
2.  $4 \times 1$  4
3.  $4 \times 2$  8
4.  $4 \times 3$  12
5.  $4 \times 4$  16
6.  $4 \times 5$  20
7.  $4 \times 6$  24
8.  $4 \times 7$  28
9.  $4 \times 8$  32
10.  $4 \times 9$  36
11.  $0 \times 4$  0
12.  $1 \times 4$  4
13.  $2 \times 4$  8
14.  $3 \times 4$  12
15.  $4 \times 4$  16
16.  $5 \times 4$  20
17.  $6 \times 4$  24
18.  $7 \times 4$  28
19.  $8 \times 4$  32
20.  $9 \times 4$  36
21.  $0 \times 0$  0
22.  $1 \times 1$  1
23.  $2 \times 2$  4
24.  $3 \times 3$  9
25.  $4 \times 4$  16
26.  $5 \times 5$  25
27.  $7 \times 4$  28
28.  $7 \times 5$  35

Solve.

29. 5  in a box. 20  
How many  in 4 boxes?
30. 4  in a stack. 24  
How many  in 6 stacks?

## REVIEW

Multiply.

- |     |                     |                     |                     |                     |
|-----|---------------------|---------------------|---------------------|---------------------|
| A24 | 1. $2 \times 5$ 10  | 2. $2 \times 6$ 12  | 3. $2 \times 7$ 14  | 4. $2 \times 8$ 16  |
|     | 5. $2 \times 9$ 18  | 6. $2 \times 4$ 8   | 7. $2 \times 3$ 6   | 8. $2 \times 2$ 4   |
| A25 | 9. $9 \times 5$ 45  | 10. $8 \times 5$ 40 | 11. $7 \times 5$ 35 | 12. $6 \times 5$ 30 |
|     | 13. $5 \times 5$ 25 | 14. $4 \times 5$ 20 | 15. $3 \times 5$ 15 | 16. $2 \times 5$ 10 |
| A26 | 17. $6 \times 3$ 18 | 18. $7 \times 3$ 21 | 19. $8 \times 3$ 24 | 20. $9 \times 3$ 27 |
|     | 21. $0 \times 3$ 0  | 22. $1 \times 3$ 3  | 23. $2 \times 3$ 6  | 24. $3 \times 3$ 9  |
| A27 | 25. $4 \times 6$ 24 | 26. $4 \times 7$ 28 | 27. $4 \times 8$ 32 | 28. $4 \times 9$ 36 |
|     | 29. $4 \times 5$ 20 | 30. $4 \times 4$ 16 | 31. $4 \times 3$ 12 | 32. $4 \times 1$ 4  |

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## Assigning the Practice

Minimum: odd numbers

Average: 1-30

Enriched: 1-30

## Review Exercises

Questions	Objective	Pages
1-8	A24	130-131
9-16	A25	132-133
17-24	A26	134-135
25-32	A27	136-137

## Reinforcement

1. Have students colour in the squares of graph paper to illustrate the 4 times table and to find the products.

$4 \times 1$        $4 \times 2$        $4 \times 3$       etc.



2. Prepare the following cards.

4 fours   4 fives   4 sixes   4 sevens   4 eights   4 nines

On the back of each card write the multiplication sentence. Have students choose a card, build what it says using an empty egg carton and beans, and find the total. Turn the card over to see the multiplication sentence it means. Encourage the combining of 2 groups and mental adding of the partial products.

## Enrichment

1. Complete each table.


$\times$	2	4
3		
5		

$\times$	2	5
4		
3		


$\times$	3	4
3		
4		

$\times$	2	5
5		
2		



2. Find the hidden numbers.

  $\times 8 = 16$

$6 \times$    $= 30$

  $\times 6 = 18$

$7 \times$    $= 21$

\*   $\times$    $= 12$

\*   $\times$    $= 6$

\*More than one answer.

## Extra Practice

Multiply.

1.  $4 \times 4 =$  16
2.  $4 \times 6 =$  24
3.  $4 \times 3 =$  12
4.  $7 \times 4 =$  28
5.  $4 \times 5 =$  20
6.  $1 \times 4 =$  4
7.  $2 \times 4 =$  8
8.  $9 \times 4 =$  36
9.  $4 \times 8 =$  32
10.  $4 \times 0 =$  0
11.  $4 \times 7 =$  28
12.  $6 \times 4 =$  24

4 boxes

9 paper clips in each box

How many paper clips in all? 36

## Worksheet A27

Pages 136-137

Unit 7 Objective	Test Questions	Pages
N8	1-8	122-123
A22	9-14	124-125
A23	15-21	126-127
A24	18-29	130-131
A25	30-37	132-133
A26	38-45	134-135
A27	46-53	136-137

# TEST

# UNIT 7

Add.

1.  $3 + 3 = 6$     2.  $6 + 3 = 9$     3.  $9 + 3 = 12$     4.  $12 + 3 = 15$

Complete the patterns.

5. 20, 25, <sup>30</sup>  $\square$ , <sup>35</sup>  $\square$ , 40    6. <sup>2</sup>  $\square$ , 4, 6, 8, <sup>10</sup>  $\square$   
 7. 3, 6, 9, 12, <sup>15</sup>  $\square$ , <sup>18</sup>  $\square$     8. 4, 8, <sup>12</sup>  $\square$ , 16, <sup>20</sup>  $\square$

Copy and complete the equations.

9.  $5 + 5 = \square 10$     10.  $2 \times 5 = \square 10$   
 11.  $2 + 2 + 2 + 2 = \square 8$     12.  $4 \times 2 = \square 8$   
 13.  $4 + 4 + 4 = \square 12$     14.  $\square 3 \times 4 = 12$   
 15.  $6 \times 2 = 2 \times \square 6$     16.  $4 \times 5 = \square 5 \times 4$     17.  $6 \times 3 = 3 \times \square 6$

Multiply.

18.  $2 \times 7 = 14$     19.  $7 \times 2 = 14$     20.  $5 \times 1 = 5$     21.  $1 \times 5 = 5$   
 22.  $2 \times 8 = 16$     23.  $2 \times 5 = 10$     24.  $2 \times 6 = 12$     25.  $2 \times 4 = 8$   
 26.  $9 \times 2 = 18$     27.  $1 \times 2 = 2$     28.  $7 \times 2 = 14$     29.  $2 \times 2 = 4$   
 30.  $3 \times 5 = 15$     31.  $6 \times 5 = 30$     32.  $9 \times 5 = 45$     33.  $1 \times 5 = 5$   
 34.  $5 \times 8 = 40$     35.  $5 \times 4 = 20$     36.  $5 \times 7 = 35$     37.  $5 \times 5 = 25$   
 38.  $2 \times 3 = 6$     39.  $6 \times 3 = 18$     40.  $0 \times 3 = 0$     41.  $9 \times 3 = 27$   
 42.  $3 \times 7 = 21$     43.  $3 \times 4 = 12$     44.  $3 \times 3 = 9$     45.  $3 \times 8 = 24$   
 46.  $2 \times 4 = 8$     47.  $4 \times 4 = 16$     48.  $6 \times 4 = 24$     49.  $4 \times 8 = 32$   
 50.  $4 \times 7 = 28$     51.  $4 \times 3 = 12$     52.  $4 \times 9 = 36$     53.  $4 \times 0 = 0$

## Post-test

Unit

Complete.

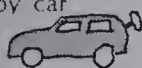
1. 4, 8, 12, 16, 20, 24    2. 3, 6, 9, 12, 15, 18  
 3. 2, 4, 6, 8, 10, 12    4. 5, 10, 15, 20, 25, 30  
 5.  $4 + 4 = \underline{8}$     6.  $8 + 4 = \underline{12}$   
 7.  $12 + 4 = \underline{16}$     8.  $16 + 4 = \underline{20}$   
 9.  $3 + 3 = \underline{6}$     10.  $2 \times 3 = \underline{6}$   
 11.  $5 + 5 = \underline{10}$     12.  $2 \times 5 = \underline{10}$   
 13.  $4 + 4 + 4 + 4 = \underline{16}$     14.  $4 \times 4 = \underline{16}$   
 15.  $2 \times 3 = 3 \times \underline{2}$     16.  $6 \times 5 = 5 \times \underline{6}$     17.  $4 \times 3 = \underline{3} \times$   
 18.  $2 \times 3 = \underline{6}$     19.  $3 \times 2 = \underline{6}$     20.  $1 \times 4 = \underline{4}$   
 21.  $4 \times 1 = \underline{4}$     22.  $2 \times 4 = \underline{8}$     23.  $2 \times 6 = \underline{12}$



## MEASUREMENT

Pick the correct **length** and **mass**.

toy car



1. 10 cm or 10 m

2. 50 g or 50 kg

small boy



3. 1 cm or 1 m

4. 20 g or 20 kg

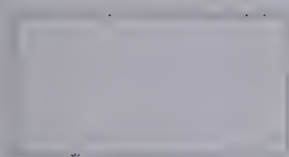
Make each equation true.

5. <sup>10</sup>  $\blacksquare$  cm = 1 dm    6. <sup>100</sup>  $\blacksquare$  cm = 1 m    7. <sup>1000</sup>  $\blacksquare$  m = 1 km

8. <sup>3</sup>  $\blacksquare$  dm = 30 cm    9. <sup>6</sup>  $\blacksquare$  m = 600 cm    10. <sup>3</sup>  $\blacksquare$  km = 3000 m

Use a centimetre ruler to measure the lengths.

11. 11 cm
12. the perimeter 12 cm    13. the perimeter 12 cm



How heavy?

14. 120 g

15. 1210 g

What temperature?

16. 26°C

Show the time in another way.

17. 2:35

18. 5:47

19. June 14, 1991  
9-6-14
20. 89-3-29  
March 29, 1989

- |                             |                              |                              |
|-----------------------------|------------------------------|------------------------------|
| 2. $2 \times 0 =$ <u>0</u>  | 25. $2 \times 8 =$ <u>16</u> | 26. $5 \times 2 =$ <u>10</u> |
| 9. $9 \times 2 =$ <u>18</u> | 28. $2 \times 2 =$ <u>4</u>  | 29. $2 \times 7 =$ <u>14</u> |
| 5. $5 \times 5 =$ <u>25</u> | 31. $3 \times 5 =$ <u>15</u> | 32. $4 \times 5 =$ <u>20</u> |
| 9. $9 \times 5 =$ <u>45</u> | 34. $2 \times 5 =$ <u>10</u> | 35. $6 \times 5 =$ <u>30</u> |
| 5. $5 \times 7 =$ <u>35</u> | 37. $5 \times 8 =$ <u>40</u> | 38. $4 \times 3 =$ <u>12</u> |
| 9. $9 \times 3 =$ <u>27</u> | 40. $3 \times 3 =$ <u>9</u>  | 41. $3 \times 1 =$ <u>3</u>  |
| 5. $5 \times 3 =$ <u>15</u> | 43. $3 \times 6 =$ <u>18</u> | 44. $8 \times 3 =$ <u>24</u> |
| 7. $7 \times 3 =$ <u>21</u> | 46. $4 \times 8 =$ <u>32</u> | 47. $4 \times 9 =$ <u>36</u> |
| 6. $6 \times 4 =$ <u>24</u> | 49. $4 \times 2 =$ <u>8</u>  | 50. $3 \times 4 =$ <u>12</u> |
| 7. $7 \times 4 =$ <u>28</u> | 52. $4 \times 4 =$ <u>16</u> | 53. $4 \times 5 =$ <u>20</u> |

# UNIT 8

## CONVERSION FACTS I



Unit 8 Objective	Test Questions	Pages
A28	1-4	142-143
A29	5-8	144-145
A30	9-16	146-147
A31	17-24	148-149
A32	25-32	150-151
A33	33-40	152-153
A34	41-44	154-155
PS	45-46	

### Pretest

Complete.

1.  $12 \div 4 = \underline{3}$

2.  $12 \div 3 = \underline{4}$

3.  $12 \div 2 = \underline{6}$

4.  $12 \div 6 = \underline{2}$

5.  $3 \times 6 = \underline{18}$

6.  $18 \div 6 = \underline{3}$

7.  $4 \times 4 = \underline{16}$

8.  $16 \div 4 = \underline{\quad}$

9.  $12 \div 2 = \underline{6}$

10.  $8 \div 2 = \underline{4}$

11.  $16 \div 2 = \underline{8}$

12.  $4 \div 2 = \underline{\quad}$

13.  $18 \div 2 = \underline{9}$

14.  $10 \div 2 = \underline{5}$

15.  $14 \div 2 = \underline{7}$

16.  $6 \div 2 = \underline{\quad}$

17.  $35 \div 5 = \underline{7}$

18.  $20 \div 5 = \underline{4}$

19.  $15 \div 5 = \underline{3}$

20.  $45 \div 5 = \underline{\quad}$

21.  $25 \div 5 = \underline{5}$

22.  $30 \div 5 = \underline{6}$

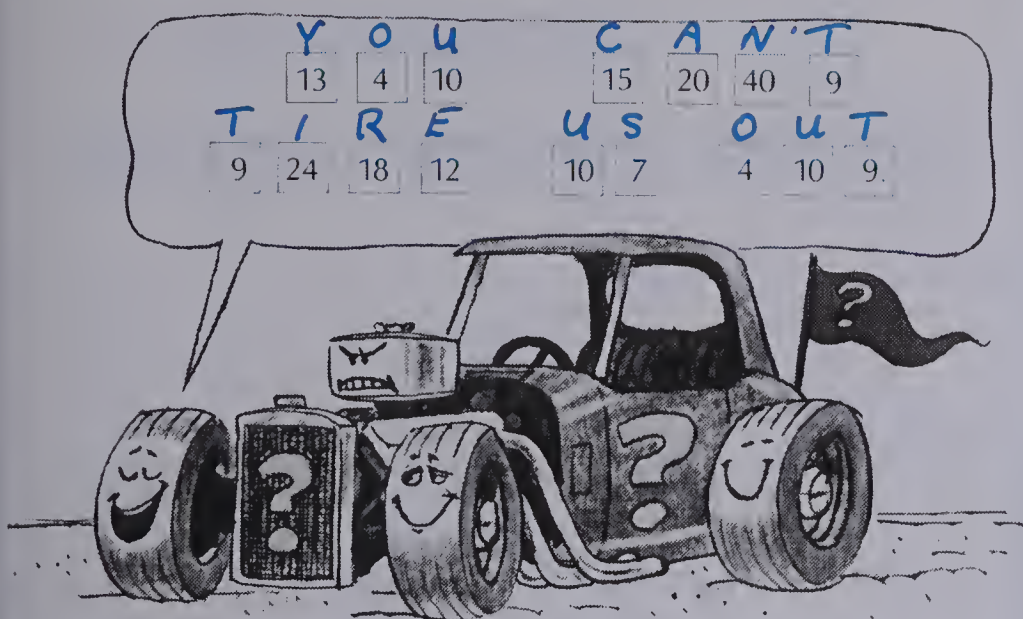
23.  $5 \div 5 = \underline{1}$

24.  $40 \div 5 = \underline{\quad}$



# Talking Wheels

What do the wheels say to the engine?



Find the answers.  
Then solve the riddle.

E	6 + 6	12	U	15 - 5	10	Y	6 + 7	13
T	3 x 3	9	E	4 x 3	12	O	2 x 2	4
O	13 - 9	4	A	30 - 10	20	U	2 x 5	10
A	4 x 5	20	T	6 + 3	9	E	9 + 3	12
N	5 x 8	40	O	4 + 0	4	S	16 - 9	7
E	2 x 6	12	T	12 - 3	9	C	5 x 3	15
I	4 x 6	24	I	12 + 12	24	R	3 x 6	18
T	1 x 9	9	R	9 + 9	18	U	5 + 5	10

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15 ÷ 3 = 5	26. 6 ÷ 3 = 2	27. 18 ÷ 3 = 6	28. 24 ÷ 3 = 8
9 ÷ 3 = 3	30. 27 ÷ 3 = 9	31. 3 ÷ 3 = 1	32. 21 ÷ 3 = 7
24 ÷ 4 = 6	34. 20 ÷ 4 = 5	35. 8 ÷ 4 = 2	36. 12 ÷ 4 = 3
16 ÷ 4 = 4	38. 28 ÷ 4 = 7	39. 36 ÷ 4 = 9	40. 32 ÷ 4 = 8
0 ÷ 5 = 0	42. 6 ÷ 1 = 6	43. 0 ÷ 9 = 0	44. 2 ÷ 1 = 2

6 bicycles  
How many wheels? 12

46. 12 wheels  
How many tricycles? 4

## UNIT 8

## PREVIEW

### Suggestions

Have the students turn to the unit title page, 140. Ask the students to tell what the unit theme is. Have them try to identify where the various wheels are from.

Play the *Missing Sign* game.

### Materials

3 blank cards 5 cm x 5 cm per student  
Have each student write "+", "-", "x" on the cards.

Set of +, -, x flash cards like the following:

$$4 \blacksquare 3 = 12$$

$$4 \blacksquare 3 = 7$$

$$4 \blacksquare 3 = 1$$

*How to play*

The teacher holds up a flash card. The students decide which operation completes the question and hold up the appropriate missing sign.

### About the Page

Follow the directions on page 141 carefully. All students should attempt the riddle.

### Reinforcement

Use flash cards to drill addition, subtraction, and multiplication facts previously learned. Have an individualized quiz session on these facts. Record the student's progress on his or her Fact Master Card as explained in the Ideas section of this unit's introduction.

### Enrichment

Explain that all the problems on page 141 are numbers *renamed* as addition, subtraction, or multiplication questions. Ask the students to list as many possible addition, subtraction, and multiplication *names* for these numbers as they can.

# UNIT 8 LESSON 1

## Objective A28

Introduce the meaning of division for the basic facts to 21.

## Introducing the Lesson

Hand a piece of paper to each student. Say, "Let's *divide* this paper into 2, then 4, 8, and 16 equal parts. We can do this by careful folding." Demonstrate this by folding in half, opening the paper up, and counting the parts. Have the students follow your example. Ask, "Into how many equal parts have I *divided* the paper?"

## Teaching the Lesson

Show the students a plate of 18 peanuts. Ask how many students will get 3 peanuts each? Pass the plate around, having each student take 3 peanuts until the plate is empty. Have the students with peanuts stand up and take a head count. Explain that 18 peanuts **divided** into groups of 3 is 6 groups.

Draw the situation on the chalkboard explaining the meaning, how we write the number sentence, and how we read the symbol " $\div$ ".

18 divided in groups of 3 is 6 groups.  
 $18 \div 3 = 6$   
 18 divided by 3 equals 6.

Show a plate of 12 peanuts and have the students divide them into groups of 3. Ask, "How many groups of 3 in 12?"

12 divided in groups of 3 is 4 groups.  
 $12 \div 3 = 4$   
 12 divided by 3 equals 4.

Use a similar procedure to model  
 $15 \div 5$  and  $10 \div 2$ .

Turn to page 142 and discuss the division situation illustrated. Explain that "divided" and "divided by" refer to the operation of *division*. Discuss the words we use for the other operations.

Addition: add, adding, plus  
 Subtraction: subtract, take away, minus  
 Multiplication: multiply, times

# Meaning of Division

How many groups of 4 in 12?



There are 3 groups of 4 in 12.



You can show this by **division**:

$$12 \div 4 = 3$$

You say: Twelve **divided by** four equals three.

## EXERCISES

Answer the question. Complete the equation.

1.



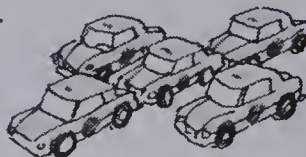
How many wheels in all? **6**  
 How many groups of 2 in 6? **3**  
 $6 \div 2 = \blacksquare \mathbf{3}$

2.



How many wheels in all? **9**  
 How many groups of 3 in 9? **3**  
 $9 \div 3 = \blacksquare \mathbf{3}$

3.



How many wheels in all? **20**  
 How many 4s in 20? **5**  
 $20 \div 4 = \blacksquare \mathbf{5}$

4.



How many wheels in all? **12**  
 How many 3s in 12? **4**  
 $12 \div 3 = \blacksquare \mathbf{4}$

142

## Using the Exercises

- Questions 1 to 4 begin with various objects having wheels. The students are to count groups of wheels on each object to determine the number of objects. This is the missing number in the division equation.



6 wheels in all  
 2 wheels for each bike.  
 6 divided into groups of 2 wheels is 3 bikes.  
 6 divided by 2 equals 3.  
 $6 \div 2 = 3$



## PRACTICE

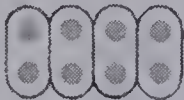
Find the answer. Complete the equation.

1.



How many dots? **8**  
How many 4s in 8? **2**  
 $8 \div 4 = \blacksquare 2$

2.



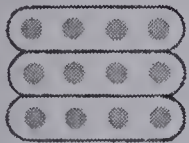
How many dots? **8**  
How many 2s in 8? **4**  
 $8 \div 2 = \blacksquare 4$

3.



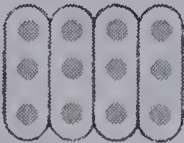
How many dots? **4**  
How many 2s in 4? **2**  
 $4 \div 2 = \blacksquare 2$

4.



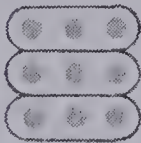
How many dots? **12**  
How many 4s in 12? **3**  
 $12 \div 4 = \blacksquare 3$

5.



How many dots? **12**  
How many 3s in 12? **4**  
 $12 \div 3 = \blacksquare 4$

6.



How many dots? **9**  
How many 3s in 9? **3**  
 $9 \div 3 = \blacksquare 3$

Divide. Draw a picture to help you.

7.  $10 \div 5 = \blacksquare 2$  8.  $10 \div 2 = \blacksquare 5$  9.  $16 \div 4 = \blacksquare 4$

10.  $14 \div 7 = \blacksquare 2$  11.  $14 \div 2 = \blacksquare 7$  12.  $6 \div 3 = \blacksquare 2$

13. 16 wheels

2 on each bicycle

How many bicycles? **8**

14. 15 balls

3 in each wagon

How many wagons? **5**

## Heavy Thinking

Karl is lighter than Ken, but heavier than Kate.

Who is the lightest? **Kate**

Who is the heaviest? **Ken**



143

## Assigning the Practice

Minimum: 1-12

Average: 1-14

Enriched: 1-14

## Reinforcement

1. Assign *Heavy Thinking* on page 143.

2. Provide each student with 20 counters (beans, macaroni, etc.). Ask them to take a specified number of them (8, 9, 10, 12, 14, 15, 16, 18, or 20); to divide them into equal groups of two, three, four, etc.; and to record the appropriate division equation.

"Divide 10 beans into groups of 5.  
How many groups of 5 will there be?"



$$10 \div 5 = 2$$

"Divide 16 beans into groups of 4.  
How many groups of 4 will there be?"



$$16 \div 4 = 4$$

## Enrichment

1. Investigate division as repeated subtraction. Have the students first recall how multiplication is like repeated addition.

$3 \times 4$  or 3 fours or  $4 + 4 + 4$ .

Explain how  $12 \div 4$  is the same as 4 repeatedly subtracted from 12.

12

-4

8

-4

4

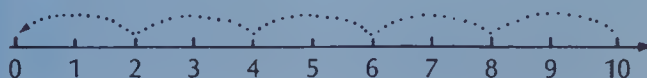
-4

0

"To reach zero, we had to subtract 4 three times."

Ask the students to rewrite several division facts as a repeated subtraction.

2. Model division with a floor number line. Ask someone to start at 10 and to make jumps of two all the way to zero. "How many jumps were made?" Record and discuss the activity with reference to a chalkboard number line.



10 divided in jumps of two = 5

$$10 \div 2 = 5$$

Try several examples.

## Extra Practice

Copy and complete the division equation.



$$9 \div 3 = \blacksquare 3$$

2.



$$15 \div 5 = \blacksquare 3$$

3.



$$12 \div 6 = \blacksquare 2$$



$$15 \div 3 = \blacksquare 5$$

5.



$$12 \div 2 = \blacksquare 6$$

6.



$$16 \div 4 = \blacksquare 4$$

## Worksheet A28

Pages 142-143


# UNIT 8 LESSON 2

## Objective A29

To relate multiplication and division facts to 21.

## Introducing the Lesson

Have the students recall the meaning and vocabulary of multiplication with the assistance of the array cards.

Show 

Ask, "How many groups or rows?" 3.  
"How many in each group or row?" 4.  
"How many in all?" 12.

Record on the chalkboard:  $3 \times 4 = 12$ .  
Review the terms *factor* and *product*.  
Repeat the procedure with other array cards.

Flash the multiplication fact cards to 21 for quick mental recall.

## Teaching the Lesson

On the overhead projector, count out 15 counters. Ask, "How many groups of 3 in 15?" 5 *threes make 15*. Arrange the counters in groups of 3 on the projector. Explain that this can be expressed in two ways, as 5 groups of 3 or as 15 divided into groups of 3.  
Record on the chalkboard:



$5 \times 3 = 15$     5 threes equal 15.  
 $15 \div 3 = 5$     15 divided by 3 equals 5.

Hold up two "related" array cards. Ask for the multiplication fact and the division fact for each card.

  $2 \times 6 = 12$       $6 \times 2 = 12$   
 $12 \div 6 = 2$      $12 \div 2 = 6$

Explain that the four facts belong to a fact family. They are related because they use the same numbers 2, 6, and 12.

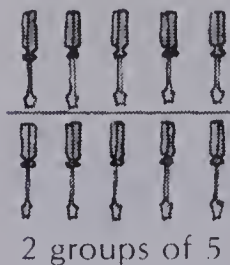
On the overhead, arrange 8 counters in the following way:

and write:  $\blacksquare \times 4 = 8$       
 $8 \div 4 = \blacksquare$     

Explain that both equations ask how many fours in 8? The answer for both is 2. Finding the **missing factor** is the same as finding the **quotient** when you divide.

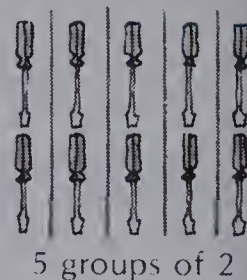
# Multiplication and Division

You can think of multiplication to help you divide.



$$2 \times 5 = 10$$

$$10 \div 5 = 2$$



$$5 \times 2 = 10$$

$$10 \div 2 = 5$$

The answer when you divide is called the **quotient**.

## EXERCISES

Copy and complete the division equations.

1.  $3 \times 4 = 12$

$12 \div 4 = \blacksquare$  <sup>3</sup>



3.  $3 \times 3 = 9$

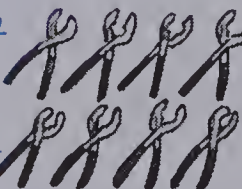
$9 \div 3 = \blacksquare$  <sup>3</sup>

2.  $4 \times 3 = 12$

$12 \div 3 = \blacksquare$  <sup>4</sup>

4.  $\blacksquare \times 4 = 8$

$8 \div 4 = \blacksquare$  <sup>2</sup>



6.  $2 \times 2 = 4$

$4 \div 2 = \blacksquare$  <sup>2</sup>

5.  $\blacksquare \times 2 = 8$

$8 \div 2 = \blacksquare$  <sup>4</sup>

## Using the Exercises

- Questions 1 to 6 ask the students to study an array of bicycle repair tools and then to write the missing factor or quotient. Note that for problems 1, 2, and 4, 5 the same array of objects is studied, since only the order of the factors has been changed.



## PRACTICE

Copy and complete.

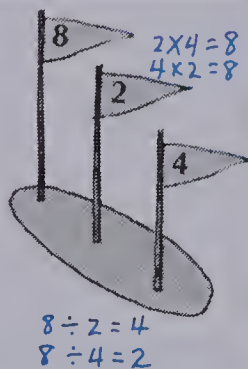
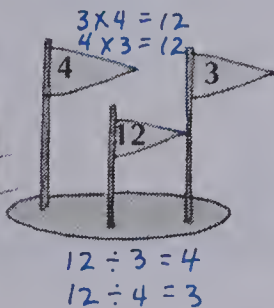
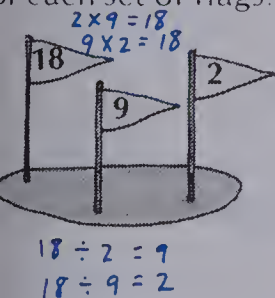
1.  $3 \times 5 = \blacksquare 15$   
 $15 \div 5 = \blacksquare 3$
2.  $5 \times 3 = \blacksquare 15$   
 $15 \div 3 = \blacksquare 5$
3.  $4 \times 4 = \blacksquare 16$   
 $16 \div 4 = \blacksquare 4$
4.  $2 \times 6 = \blacksquare 12$   
 $12 \div 6 = \blacksquare 2$
5.  $6 \times 2 = \blacksquare 12$   
 $12 \div 2 = \blacksquare 6$
6.  $7 \times 3 = \blacksquare 21$   
 $21 \div 3 = \blacksquare 7$
7.  $2 \blacksquare \times 3 = 6$   
 $6 \div 3 = \blacksquare 2$
8.  $3 \blacksquare \times 2 = 6$   
 $6 \div 2 = \blacksquare 3$
9.  $5 \blacksquare \times 4 = 20$   
 $20 \div 4 = \blacksquare 5$
10.  $4 \blacksquare \times 5 = 20$   
 $20 \div 5 = \blacksquare 4$
11.  $5 \blacksquare \times 2 = 10$   
 $10 \div 2 = \blacksquare 5$
12.  $3 \blacksquare \times 3 = 9$   
 $9 \div 3 = \blacksquare 3$

Solve.

13. 5 rows  
3 cars in each row  
How many cars in all? 15
14. 15 passengers  
5 passengers in each car  
How many cars? 3
15. 16 pedals  
2 for each bike  
How many bicycles? 8
16. 18 wheels  
3 for each scooter  
How many scooters? 6

## Bicycle Challenge

Write two multiplication and two division sentences for each set of flags.



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## Extra Practice

Complete.

1.  $2 \times 6 = \underline{12}$
2.  $6 \times 2 = \underline{12}$
3.  $2 \times 4 = \underline{8}$
4.  $12 \div 6 = \underline{2}$
5.  $12 \div 2 = \underline{6}$
6.  $8 \div 4 = \underline{2}$
7.  $4 \times 2 = \underline{8}$
8.  $2 \times 2 = \underline{4}$
9.  $4 \div 2 = \underline{2}$
10.  $8 \div 2 = \underline{4}$
11.  $3 \times 3 = \underline{9}$
12.  $9 \div 3 = \underline{3}$
13.  $7 \times 3 = 21$
14.  $6 \times 3 = 18$
15.  $9 \times 3 = 27$
16.  $21 \div 3 = \underline{7}$
17.  $18 \div 3 = \underline{6}$
18.  $27 \div 3 = \underline{9}$

## Worksheet A29

Pages 144-145

## Assigning the Practice

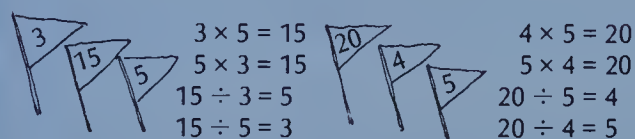
Minimum: 1-14

Average: 1-16

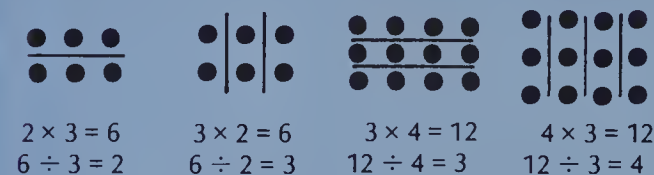
Enriched: 1-16

## Reinforcement

1. Before assigning *Bicycle Challenge* on page 145, practise several similar examples. Ask each student to write his or her four related multiplication and division facts on the chalkboard for all to see.

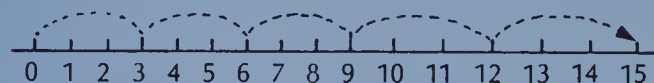


2. Have students use the array cards to write the appropriate multiplication and division equation. (The answer should be on the back as a check.)



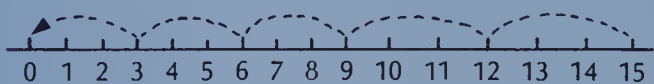
## Enrichment

1. Demonstrate that the number line can illustrate related multiplication and division facts. Begin by using a floor number line and have the pupils illustrate the facts with their jumps. Later, arrow jumps can be drawn on the chalkboard number line or on paper.



Five jumps of three = 15.

$$5 \times 3 = 15.$$



15 divided into jumps of 3 = 5.

$$15 \div 3 = 5$$

2. Prepare a worksheet or cards with the following sets of numbers. Students are to write 4 related number sentences about a fact family using + and - or  $\times$  and  $\div$ .



# UNIT 8 LESSON 3

## Objective A30

Divide by 2 with dividends to 18.

### Introducing the Lesson

Show 9 pairs of socks. Have students count aloud by twos to find how many socks in all. Write the equation on the board.

$$9 \text{ twos} = 18$$

$$9 \times 2 = 18$$

Review vocabulary:

factor  $\times$  factor = product

Show the missing factor cards one at a time.  $\blacksquare \times 2 = 10$

Ask what it means (How many twos make 10?). Encourage the use of skip counting by twos to find the missing factor.

### Teaching the Lesson

Show 16 assorted socks (8 pairs). Ask, "How many pairs or groups of socks are there?" Have students do the dividing and show the 8 twos. Record the situation on the chalkboard.

$$16 \text{ divided into twos is } 8.$$

$$16 \div 2 = 8$$

Explain that another way to solve the situation is to think of multiplication.

Think: How many twos in 16?

Write:  $\blacksquare \times 2 = 16$  (missing factor)

$$16 \div 2 = \blacksquare \text{ (quotient)}$$

The answer to both is 8.

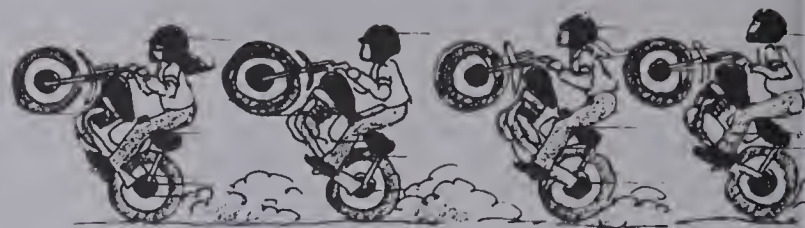
Emphasize that the missing factor is the same as the quotient. To find the missing factor:

- Skip count by twos: 2, 4, 6, 8, 10, 12, 14, 16. I used 8 fingers. So  $8 \times 2 = 16$  and  $16 \div 2 = 8$ .
- Recall the 2 times table. Since  $2 \times 8 = 16$ ,  $8 \times 2 = 16$  and  $16 \div 2 = 8$ .

Repeat the same procedure with other examples, emphasizing what to think and how to find the missing factor or quotient.

Direct students to the top of page 146. Discuss the motorcycles dividing 8 wheels into twos.

## Two



8 wheels in all

2 wheels on each motorcycle

How many motorcycles are there?

Think! How many groups of 2 in 8?

factor		factor		product
$\blacksquare$	$\times$	2	=	8
8	$\div$	2	=	4
				quotient

Dividing is like finding a **missing factor**.



There are 4 motorcycles in all.

### EXERCISES

Copy and complete the equations.

1. How many groups of 2 in 2?

$$1 \blacksquare \times 2 = 2$$

$$2 \div 2 = \blacksquare 1$$

2. How many groups of 2 in 4?

$$2 \blacksquare \times 2 = 4$$

$$4 \div 2 = \blacksquare 2$$

3. How many groups of 2 in 6?

$$3 \blacksquare \times 2 = 6$$

$$6 \div 2 = \blacksquare 3$$

4.  $4 \blacksquare \times 2 = 8$

$$8 \div 2 = \blacksquare 4$$

5.  $5 \blacksquare \times 2 = 10$

$$10 \div 2 = \blacksquare 5$$

6.  $6 \blacksquare \times 2 = 12$

$$12 \div 2 = \blacksquare 6$$

7.  $7 \blacksquare \times 2 = 14$

$$14 \div 2 = \blacksquare 7$$

8.  $8 \blacksquare \times 2 = 16$

$$16 \div 2 = \blacksquare 8$$

9.  $9 \blacksquare \times 2 = 18$

$$18 \div 2 = \blacksquare 9$$

### Using the Exercises

- Questions 1 to 9 ask the students to find the missing factor and quotient in each pair of equations.







## PRACTICE



Divide.



1.  $18 \div 2 = 9$  2.  $16 \div 2 = 8$  3.  $14 \div 2 = 7$  4.  $12 \div 2 = 6$   
 5.  $10 \div 2 = 5$  6.  $8 \div 2 = 4$  7.  $6 \div 2 = 3$  8.  $4 \div 2 = 2$   
 9.  $2 \div 2 = 1$  10.  $18 \div 2 = 9$  11.  $16 \div 2 = 8$  12.  $10 \div 2 = 5$

Solve.

13. 10   
 2  on each bicycle  
 How many bicycles? 5

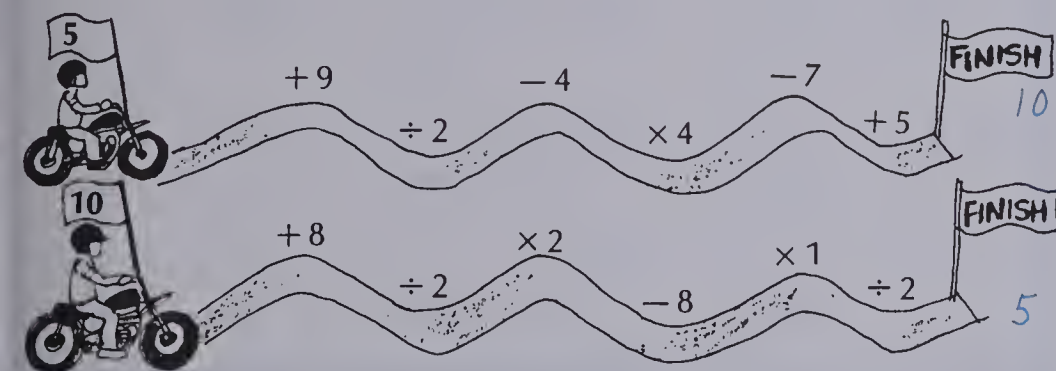
14. 16   
 2  in each wagon  
 How many wagons? 8

15. 14   
 2  on each bicycle  
 How many bicycles? 7

16. 2   
 2  on each car  
 How many cars? 1

## Motorcycle Challenge

Find the number at the end of each course.



147

## Extra Practice

Write the quotient.

$6 \div 2 = \underline{3}$   
 $18 \div 2 = \underline{9}$   
 $16 \div 2 = \underline{8}$

2.  $14 \div 2 = \underline{7}$   
 5.  $10 \div 2 = \underline{5}$   
 8.  $12 \div 2 = \underline{6}$

3.  $8 \div 2 = \underline{4}$   
 6.  $2 \div 2 = \underline{1}$   
 9.  $4 \div 2 = \underline{2}$

Write the missing factor.

$\underline{4} \times 2 = 8$   
 $\underline{5} \times 2 = 10$

11.  $\underline{9} \times 2 = 18$   
 14.  $\underline{8} \times 2 = 16$

12.  $\underline{1} \times 2 = 2$   
 15.  $\underline{6} \times 2 = 12$

## Worksheet A30

Pages 146-147

## Assigning the Practice

Minimum: 1-16

Average: 1-16

Enriched: 1-16

## Reinforcement

1. Before assigning *Motorcycle Challenge* on page 147, try some similar examples on the chalkboard.

$(18) \rightarrow (-2) \rightarrow (\div 4) \rightarrow (+3) \rightarrow (\times 2) = ?$

Once the students become more proficient, try the same type of problem as an oral drill, allowing no paper or pencil.

2. Play "Snap" with the missing factor and division fact cards. Turn the cards over forming 2 piles. Each player simultaneously turns up the first card in each pile. If they *match*, the players must say *Snap*, and tell the missing factor and quotient. If correct, the player keeps the pair. If incorrect, the cards are discarded and play continues. The winner is the person with the most pairs.

3. Have students review the division fact cards for two, either individually or in pairs. Allow the use of counters or the drawing of arrays to help them find the quotient.

## Enrichment

1. Develop the *division* facts related to the division facts with a divisor of 2 ( $12 \div 2 = \blacksquare$  and  $12 \div \blacksquare = 6$ ). Give each student a set of counters. Ask them to count out 12 beans. "Divide these 12 beans into groups of 2." Write the equation ( $12 \div 2 = 6$ ). "Now divide the beans into groups of 6. How many groups are there?" Two. Write the equation  $12 \div 6 = 2$ . Note that the factors (2 and 6) changed order. Have the students model several other division facts, draw their models, and record the two *related division facts*.

2. Show how the two division facts can be found by skip counting back by twos. With each count back, tap a finger lightly on the desk.

$8 \div 2 = \blacksquare$

Six, four, two, zero. 4 taps

$8 \div 2 = 4$

## Objective A31

Divide by 5 with dividends to 45

## Introducing the Lesson

Stack 45 pennies into 9 groups of 5. Have the students skip count by fives to find how much money. Write on the chalkboard:

$$9 \text{ fives} = 45$$

$$9 \times 5 = 45$$

Review the five times table this way.

Show the missing factor cards one at a time  $\blacksquare \times 5 = 15$ .

Ask what each means. ("How many fives make 15?") Encourage the use of skip counting by fives to find the missing factor. Rather than using the stacks of pennies, students can use their fingers to tap 5, 10, 15, using 3 fingers in all. The missing factor is 3.

Note: Explain that another way to find the missing factor is to recite the 5 times table until the correct one is found.  $5 \times 1 = 5$ ,  $5 \times 2 = 10$ ,  $5 \times 3 = 15$ . Therefore,  $3 \times 5 = 15$ . The missing factor is 3.

## Teaching the Lesson

Count out 30 pennies. Ask, "Into how many groups of 5 can 30 pennies be divided?" Explain that we can think and write:  $\blacksquare \times 5 = 30$

$$30 \div 5 = \blacksquare$$

To find the missing factor and quotient:

a. Skip count by fives: 5, 10, 15, 20, 25, 30. I used 6 fingers. So  $6 \times 5 = 30$  and  $30 \div 5 = 6$ .

b. Recall the 5 times table:  $5 \times 1 = 5$ ,  $5 \times 2 = 10$ ,  $5 \times 3 = 15$ ,  $5 \times 4 = 20$ ,  $5 \times 5 = 25$ ,  $5 \times 6 = 30$ . The missing factor is 6.

Repeat the same procedure with 15 pennies and 35 pennies, emphasizing what to think and how to find the missing factor and quotient.

Refer to page 148 to review the division of tires into stacks of 5.

## Five



45 tires

5 tires in each stack

How many stacks of tires are there?

Think! How many groups of 5 in 45?

$$\blacksquare \times 5 = 45$$

$$45 \div 5 = 9$$

There are 9 stacks of 5 in 45

EXERCISES

Use the picture above to help you complete each equation

1. How many groups of 5 in 5?

$$1 \blacksquare \times 5 = 5$$

$$5 \div 5 = \blacksquare 1$$

2. How many groups of 5 in 10?

$$2 \blacksquare \times 5 = 10$$

$$10 \div 5 = \blacksquare 2$$

3. How many groups of 5 in 15?

$$3 \blacksquare \times 5 = 15$$

$$15 \div 5 = \blacksquare 3$$

4.  $4 \blacksquare \times 5 = 20$

$$20 \div 5 = \blacksquare 4$$

5.  $5 \blacksquare \times 5 = 25$

$$25 \div 5 = \blacksquare 5$$

6.  $6 \blacksquare \times 5 = 30$

$$30 \div 5 = \blacksquare 6$$

7.  $7 \blacksquare \times 5 = 35$

$$35 \div 5 = \blacksquare 7$$

8.  $8 \blacksquare \times 5 = 40$

$$40 \div 5 = \blacksquare 8$$

9.  $9 \blacksquare \times 5 = 45$

$$45 \div 5 = \blacksquare 9$$

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## Using the Exercises

- Questions 1 to 9 include all the division by five facts with dividends from 5 to 45. Each fact is written two ways: as a multiplication equation with a missing factor and as a division equation with a missing quotient.









## PRACTICE





Divide.

1.  $15 \div 5 = 3$
2.  $10 \div 5 = 2$
3.  $45 \div 5 = 9$
4.  $30 \div 5 = 6$
5.  $40 \div 5 = 8$
6.  $5 \div 5 = 1$
7.  $35 \div 5 = 7$
8.  $25 \div 5 = 5$
9.  $20 \div 5 = 4$
10.  $10 \div 2 = 5$
11.  $10 \div 5 = 2$
12.  $40 \div 5 = 8$

Solve.

13. 30  in all
14. 20  in all
15. 25  in all
- 5  in each row
- 5  in each car
- 5  for each car
- How many rows? 6
- How many cars? 4
- How many cars? 5

Copy and complete the equations

1.   $12 \div 4 = \blacksquare 3$
2.   $12 \div 3 = \blacksquare 4$
3.   $10 \div 5 = \blacksquare 2$
4.   $10 \div 2 = \blacksquare 5$
5.  $3 \times 2 = \blacksquare 6$
6.  $2 \times 3 = \blacksquare 6$
7.  $6 \times 3 = \blacksquare 18$
8.  $3 \times 6 = \blacksquare 18$
9.  $6 \div 2 = \blacksquare 3$
10.  $2 \div 3 = \blacksquare 2$
11.  $18 \div 3 = \blacksquare 6$
12.  $18 \div 6 = \blacksquare 3$

Divide.

9.  $4 \div 2 = 2$
10.  $14 \div 2 = 7$
11.  $18 \div 2 = 9$
12.  $2 \div 2 = 1$
13.  $8 \div 2 = 4$
14.  $16 \div 2 = 8$
15.  $12 \div 2 = 6$
16.  $10 \div 2 = 5$
17.  $40 \div 5 = 8$
18.  $20 \div 5 = 4$
19.  $45 \div 5 = 9$
20.  $25 \div 5 = 5$
21.  $15 \div 5 = 3$
22.  $30 \div 5 = 6$
23.  $10 \div 5 = 2$
24.  $35 \div 5 = 7$

149

## Extra Practice

Write the quotient.

1.  $15 \div 5 = \underline{3}$
2.  $40 \div 5 = \underline{8}$
3.  $5 \div 5 = \underline{1}$
4.  $25 \div 5 = \underline{5}$
5.  $10 \div 5 = \underline{2}$
6.  $45 \div 5 = \underline{9}$
7.  $20 \div 5 = \underline{4}$
8.  $35 \div 5 = \underline{7}$
9.  $30 \div 5 = \underline{6}$

Write the missing factor.

1.  $\underline{2} \times 5 = 10$
11.  $\underline{8} \times 5 = 40$
12.  $\underline{4} \times 5 = 20$
2.  $\underline{3} \times 5 = 15$
14.  $\underline{9} \times 5 = 45$
15.  $\underline{5} \times 5 = 25$

## Worksheet A31

Pages 148-149

## Assigning the Practice

Minimum: 1-15

Average: 1-15

Enriched: 1-15

## Review Exercises

Questions	Objective	Pages
1-4	A28	142-143
5-8	A29	144-145
9-16	A30	146-147
17-24	A31	148-149

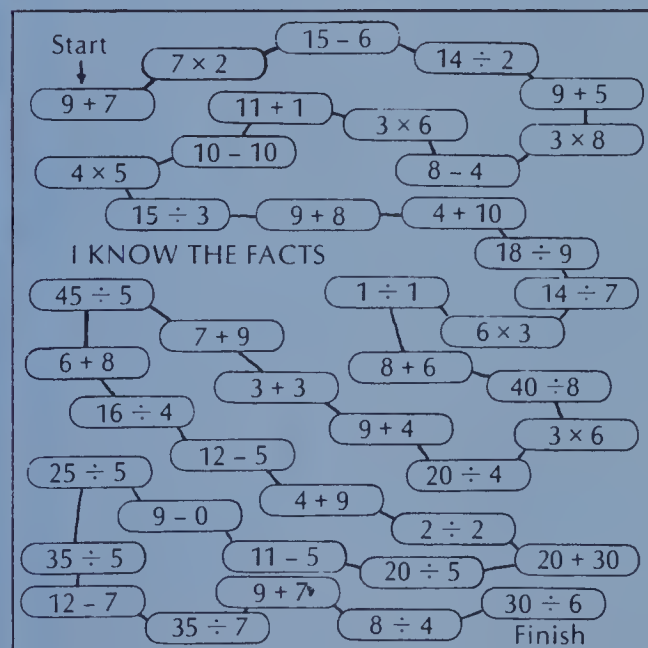
## Reinforcement

1. Have students work alone to match the missing factor and division fact cards. ( $\blacksquare \times 5 = 25$  and  $25 \div 5 = \blacksquare$ )
2. Prepare 9 triangles from sturdy cardboard. Place numbers in each corner. Cover one number by holding the triangle at the corner. Ask the students to give the correct number sentence using  $\times$  or  $\div$ .



## Enrichment

1. Play the game, "I Know the Facts".



Using the above game board and a die labelled 1, 2, 3, 1, 2, 3, each player takes a turn by rolling the die and moving the number of circles forward as indicated on the die. The player must then give the answer. If correct, he stays where he landed; if incorrect, he goes back to the start. The first player to go around the board wins.

2. Combine the division fact cards for 2 and 5. Have students practise flashing them at each other.

## Objective A32

Divide by 3 with dividends to 27.

### Introducing the Lesson

Recall skip counting by threes with the whole class. Refer to the set of traffic lights on page 150 to review the multiplication facts for 3. Record them on the chalkboard.  $1 \times 3 = \blacksquare$ ,  $2 \times 3 = \blacksquare$ ,  $9 \times 3 = \blacksquare$ .

Show the missing factor cards one at a time. Review the 2 ways to find the missing factor:  $\blacksquare \times 3 = 9$ .

Think how many threes make 9.

a. Skip count by threes: 3, 6, 9. I used 3 fingers. The missing factor is 3.

b. Recite the 3 times table:  $3 \times 1 = 3$ ,  $3 \times 2 = 6$ ,  $3 \times 3 = 9$ . The missing factor is 3.

### Teaching the Lesson

Point out the airplane wheels on page 150. Discuss the situation modelled. Ask how to find the missing factor and quotient. Encourage the use of skip counting or reciting the 3 times table. (3, 6, 9, 12, 15, 18. I used 6 fingers, so the missing factor is 6 and  $18 \div 3 = 6$ , or  $3 \times 5 = 15$ ,  $3 \times 6 = 18$ . Therefore,  $6 \times 3 = 18$  and  $18 \div 3 = 6$ .) Ask "How many threes in 24?" Write on the chalkboard:  $\blacksquare \times 3 = 24$

$$24 \div 3 = \blacksquare$$

Discuss how to find the missing factor and quotient. Direct students to a multiplication chart. Explain that division can also be shown on the chart.

x	0	1	2	3	4...9
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2	4	6	8
3	0	3	6	9	12
.					
.					
9					

Highlight the vertical column headed by 3. Choose the division fact card  $6 \div 3 = \blacksquare$ . Start at 6 under row 3 and read the quotient from the column at the far left of 6. Six divided by 3 equals 2. Repeat with the rest of the division fact cards.

## Three



18 wheels

3 wheels on each plane

How many planes are there in all?

Think! How many groups of 3 in 18?

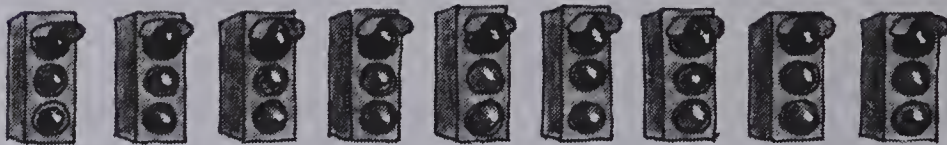
$$\blacksquare \times 3 = 18$$

$$18 \div 3 = 6$$

There are 6 planes in all.

Remember that dividing is like finding a missing factor.

### EXERCISES



Complete the equations.

1. How many groups of 3 in 3?

$$1 \blacksquare \times 3 = 3$$

$$3 \div 3 = \blacksquare$$

2. How many groups of 3 in 6?

$$2 \blacksquare \times 3 = 6$$

$$6 \div 3 = \blacksquare$$

3. How many groups of 3 in 9?

$$3 \blacksquare \times 3 = 9$$

$$9 \div 3 = \blacksquare$$

4.  $4 \blacksquare \times 3 = 12$

$$12 \div 3 = \blacksquare$$

5.  $5 \blacksquare \times 3 = 15$

$$15 \div 3 = \blacksquare$$

6.  $6 \blacksquare \times 3 = 18$

$$18 \div 3 = \blacksquare$$

7.  $7 \blacksquare \times 3 = 21$

$$21 \div 3 = \blacksquare$$

8.  $8 \blacksquare \times 3 = 24$

$$24 \div 3 = \blacksquare$$

9.  $9 \blacksquare \times 3 = 27$

$$27 \div 3 = \blacksquare$$

150

### Using the Exercises

- Questions 1 to 9 include all the division by three facts with dividends from 3 to 27. Each fact is written as a missing factor in a multiplication equation and as an unknown quotient in a division equation.
- Encourage the use of the traffic lights to find the missing factors.















## PRACTICE

Divide.

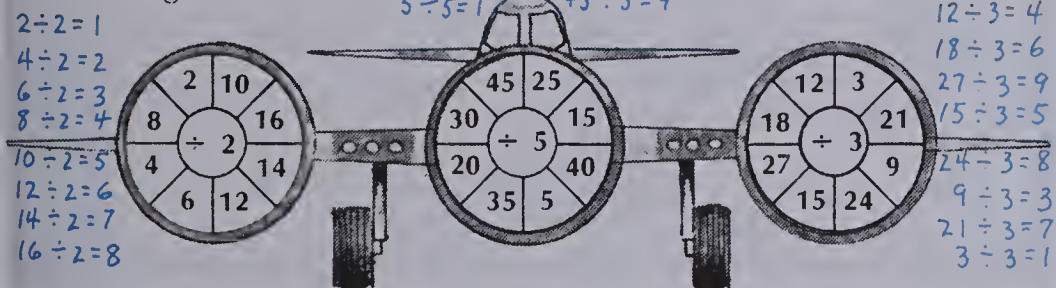
1.  $15 \div 3 = 5$
2.  $12 \div 3 = 4$
3.  $3 \div 3 = 1$
4.  $9 \div 3 = 3$
5.  $21 \div 3 = 7$
6.  $18 \div 3 = 6$
7.  $27 \div 3 = 9$
8.  $24 \div 3 = 8$
9.  $6 \div 3 = 2$
10.  $6 \div 2 = 3$
11.  $15 \div 3 = 5$
12.  $15 \div 5 = 3$

Solve.

17. 24  in all  
3  on each tricycle  
How many tricycles? 8
18. 18  in all  
3  in each plane  
How many planes? 6
19. 15  in all  
3  for each race  
How many races? 5
20. 6  in all  
2  for each tire  
How many tires? 3
21. 27  in all  
3  at each stop  
How many stops? 9
22. 15  in all  
5  in each car  
How many cars? 3

## Taking Off

Trace and complete the division engines.



151

## Assigning the Practice

Minimum: 1-20

Average: 1-22

Enriched: 1-22

## Reinforcement

1. Assign *Taking Off* on page 151. To prepare for this, place a large cardboard box "computer" at the front of the room. Include on the box an input slot, an output slot, and a rule display clip and peep hole.

a. Find the output.

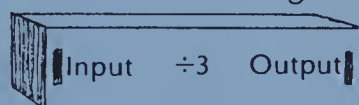
Have someone put a number card through the input slot. A student inside the computer box applies the rule and sends the answer through the output slot.

b. Find the input.

The computer puts out a number on a card. The student must determine the input by finding the missing factor.

c. Guess the rule.

Number cards are put in. Answers come out. The students guess the rule.



2. Match the missing factor and division fact cards. Time the students to see who can match them and tell the quotient and missing factors the fastest.

## Enrichment

1. Combine the missing factor cards and division fact cards from Lessons 3, 4, and 5 for a game of "Fish". Four cards are dealt to each player and the remaining cards placed face down in the centre of the table. The players take turns drawing cards and discarding unwanted cards, always maintaining four cards in their hands. Players try to match the missing factor cards with the division fact cards. When they get a pair, they lay them down on the table and pick two more cards. The person with the most pairs when the cards run out wins.

2. Investigate the different kinds of equal groupings possible for 15, 18, 20, 24, 30, or 36. Give the students counters and ask them to draw the groupings and to write the four related multiplication and division equations.

## Extra Practice

Write the quotient.

$12 \div 3 = \underline{4}$

$24 \div 3 = \underline{8}$

$9 \div 3 = \underline{3}$

$15 \div 3 = \underline{5}$

$21 \div 3 = \underline{7}$

$3 \div 3 = \underline{1}$

$18 \div 3 = \underline{6}$

$27 \div 3 = \underline{9}$

$6 \div 3 = \underline{2}$

Write the missing factor.

$\underline{7} \times 3 = 21$

$\underline{5} \times 3 = 15$

$\underline{8} \times 3 = 24$

$\underline{1} \times 3 = 3$

$\underline{9} \times 3 = 27$

$\underline{3} \times 3 = 9$

## Worksheet A32

Pages 150-151

Objective A33

Divide by 4 with dividends to 36.

Introducing the Lesson

Have students close their eyes and skip count by fours to 40.

Write the 4 times table on the board and review how to find the products.

- a. Use known facts:  $4 \times 2 = 2 \times 4 = 8$
- b. Use skip counting:  $4 \times 5$ : 5, 10, 15, 20
- c. Use the distributive property from Unit 7, Lesson 8:  
 $4 \times 8 = 2 \text{ eights} + 2 \text{ eights} = 16 + 16 = 32$

Teaching the Lesson

Direct students to the race cars on page 152. Read and discuss the division situation modelled. Emphasize that finding the missing factor is like finding the quotient.

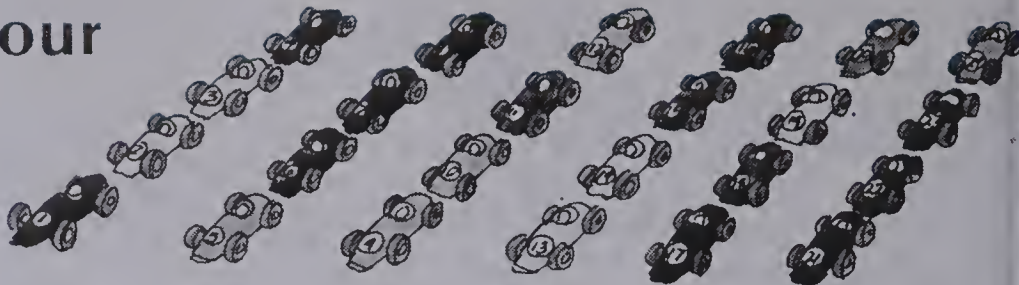
Have the students count the wheels in the first row of race cars on page 152. Ask how many groups of 4 wheels in 16? Record on the chalkboard:  
 $\blacksquare \times 4 = 16$  Ask for the missing factor  $16 \div 4 = \blacksquare$  and quotient.  
Have the students count the wheels in the first 2 rows of race cars. Ask how many groups of 4 wheels in 32? Record on the chalkboard:  
 $\blacksquare \times 4 = 32$  Ask for the missing factor  $32 \div 4 = \blacksquare$  and quotient.

Refer to a multiplication chart to show the division facts with 4.

X	0	1	2	3	4
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2	4	6	8
3	0	3	6	9	12
4	0	4	8	12	16

Highlight the vertical column headed by 4. Choose a division fact card ( $12 \div 4 = \blacksquare$ ). Start at 12, move to the top of row 4 and read the quotient in the column at the far left of the 12. (12 divided by 4 equals 3.) Repeat with the rest of the division fact cards.

Four



24 race cars  
4 in each row  
How many rows?

Think! How many groups of 4 in 24?

$\blacksquare \times 4 = 24$   
 $24 \div 4 = 6$

There are 6 rows of race cars.

EXERCISES



Complete the equations

1. How many groups of 4 in 4?  
 $1 \blacksquare \times 4 = 4$   
 $4 \div 4 = \blacksquare 1$
2. How many groups of 4 in 8?  
 $2 \blacksquare \times 4 = 8$   
 $8 \div 4 = \blacksquare 2$
3. How many groups of 4 in 12?  
 $3 \blacksquare \times 4 = 12$   
 $12 \div 4 = \blacksquare 3$
4.  $4 \blacksquare \times 4 = 16$   
 $16 \div 4 = \blacksquare 4$
5.  $5 \blacksquare \times 4 = 20$   
 $20 \div 4 = \blacksquare 5$
6.  $6 \blacksquare \times 4 = 24$   
 $24 \div 4 = \blacksquare 6$
7.  $7 \blacksquare \times 4 = 28$   
 $28 \div 4 = \blacksquare 7$
8.  $8 \blacksquare \times 4 = 32$   
 $32 \div 4 = \blacksquare 8$
9.  $9 \blacksquare \times 4 = 36$   
 $36 \div 4 = \blacksquare 9$

Using the Exercises

- Questions 1 to 9 include all the division by four facts with dividends from 4 to 36. Each fact is written as a missing factor in a multiplication equation and as an unknown quotient in a division equation.
- Encourage the use of the wheels on the chassis pictured to find the missing factors.





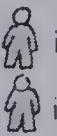

## PRACTICE



Divide.

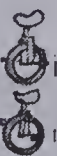

1.  $24 \div 4 = 6$
2.  $32 \div 4 = 8$
3.  $4 \div 4 = 1$
4.  $16 \div 4 = 4$
5.  $28 \div 4 = 7$
6.  $36 \div 4 = 9$
7.  $8 \div 4 = 2$
8.  $12 \div 4 = 3$
9.  $20 \div 4 = 5$
10.  $20 \div 5 = 4$
11.  $12 \div 4 = 3$
12.  $12 \div 3 = 4$
13.  $8 \div 4 = 2$
14.  $8 \div 2 = 4$
15.  $32 \div 4 = 8$
16.  $28 \div 4 = 7$

Solve.

17.  in all  
4  on each car  
How many cars? 9

18.  in all  
4  in each car  
How many cars? 7

19.  in all  
4  in each box  
How many boxes? 6

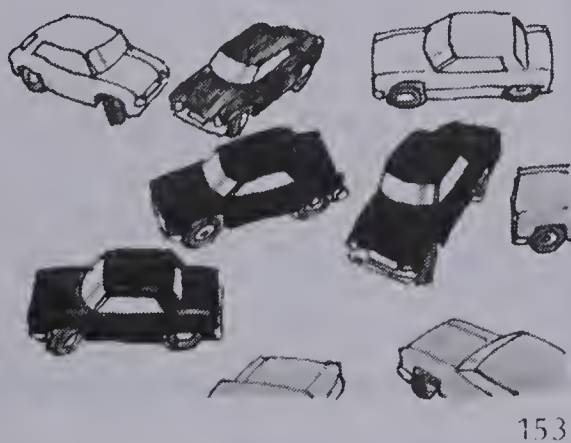
20.  in all  
4  in each row  
How many rows? 5

## Parking Lot Challenge

Help Jean arrange 24 cars in equal size rows.

Use dot pictures to show each arrangement

number of rows	number of cars
1	24
2	12
3	8
4	6
6	4
8	3
12	2
24	1



## Assigning the Practice

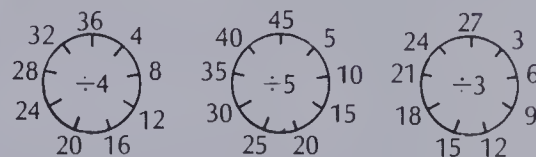
Minimum: 1-20

Average: 1-20

Enriched: 1-20

## Reinforcement

1. Play *Beat the Clock* as shown on page 133. See who can say all of one clock in 30 seconds.



2. Ask the students to solve the following worksheet puzzle to find a hidden number. When done properly, a red four appears on a blue-and-green checkered background. Colour all answers more than 23 green. Colour all answers less than 11 red. Colour answers between 11 and 23 blue.

$5 \times 8$	$28 \div 4$	$9 \times 3$	$35 \div 5$	$8 \times 4$
$3 \times 6$	$45 \div 5$	$4 \times 3$	$27 \div 3$	$5 \times 3$
$9 \times 5$	$18 \div 3$	$32 \div 4$	$24 \div 4$	$7 \times 4$
$2 \times 7$	$3 \times 8$	$4 \times 4$	$36 \div 4$	$4 \times 5$
$4 \times 9$	$9 \times 2$	$7 \times 5$	$40 \div 5$	$6 \times 4$

3. Make a multiplication table to include the twos, threes, fours, and fives. Use it for solving division questions.

X	1	2	3	4	5	6	7	8	9
2									
3									
4									
5									

## Enrichment

1. Assign *Parking Lot Challenge* on page 153. Try finding all possible arrangements for 12 cars, 20 cars, 30 cars, or 36 cars. Have the students draw each arrangement.

2. Display several numbers and sign cards and ask the students to write as many true equations as they can. For example:

$\times$   $\div$   $-$   $+$   $=$

$4$   $32$   $5$   $4$   $9$   $8$   $4$   $45$   $16$

$16 \div 4 = 4$   $32 \div 4 = 8$   $45 \div 9 = 5$   
 $4 \times 4 = 16$   $32 \div 8 = 4$   $45 \div 5 = 9$   
 $5 + 4 = 9$   $4 \times 8 = 32$   $5 \times 9 = 45$  etc.

3. Have an individualized quiz session on the division facts learned to date. Record the progress on the Division Fact Master Card.

## Extra Practice

Write the quotient.

1.  $12 \div 4 = 3$
2.  $24 \div 4 = 6$
3.  $4 \div 4 = 1$
4.  $32 \div 4 = 8$
5.  $20 \div 4 = 5$
6.  $8 \div 4 = 2$
7.  $36 \div 4 = 9$
8.  $28 \div 4 = 7$
9.  $16 \div 4 = 4$

Write the missing factor.

10.  $8 \times 4 = 32$
11.  $1 \times 4 = 4$
12.  $5 \times 4 = 20$
13.  $7 \times 4 = 28$
14.  $3 \times 4 = 12$
15.  $9 \times 4 = 36$

## Worksheet A33

Pages 152-153

**Objective A34**

Use zero and one in division.

**Introducing the Lesson**

Write the words unicycle, bicycle, and tricycle on the board. Ask how many wheels are on a bicycle. Underline the prefix *bi*. Repeat for tricycle and unicycle.

**Teaching the Lesson**

Place nine cardboard wheels on the chalkboard ledge. Tell the students that you want to make unicycles with these wheels. Develop the missing factor and the division equations. Ask, "How many ones in 9?"

■ unicycles = 9 wheels

9 unicycles = 9 wheels

$9 \times 1 = 9$  wheels

or

9 wheels divided into  
groups of 1 = 9 unicycles

$9 \div 1 = 9$

Develop a pattern for making unicycles:

9 wheels       $9 \div 1 = 9$  unicycles

8 wheels       $8 \div 1 = 8$  unicycles

Continue the pattern to:

1 wheel       $1 \div 1 = 1$  unicycle

0 wheels       $0 \div 1 = 0$  unicycles

Point out that *no* wheels make *no* unicycles.

■ unicycles = 0 wheels

0 unicycles = 0 wheels

or  $0 \times 1 = 0$

or

0 wheels divided into  
groups of 1 = 0 unicycles

$0 \div 1 = 0$

Bicycles, tricycles, wagons, trucks, etc. can also be made with cardboard wheels. Each time stress the meaning of zero and one in division.

Remember that  $0 \div 4 = 0$  since  $0 \times 4 = 0$

$0 \div 5 = 0$  since  $0 \times 5 = 0$

But: division by zero is not possible.

There is no answer for  $4 \div 0$ , since

■  $\times 0 = 4$  has no answer. Zero can only be a dividend, not a divisor.

**Zero and One**

4 wheels

1 wheel for each unicycle

How many unicycles can be made?

Remember that multiplication can help.

$$4 \times 1 = 4$$

$$4 \div 1 = 4$$

4 unicycles can be made.



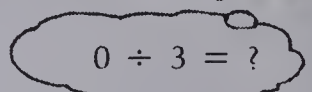
There are no wheels left.

How many tricycles can be made?

$$0 \times 3 = 0$$

$$0 \div 3 = 0$$

No tricycles can be made.

**EXERCISES**

Copy and complete the equations.

1.  $6 \blacksquare \times 1 = 6$

$6 \div 1 = \blacksquare 6$

2.  $0 \blacksquare \times 9 = 0$

$0 \div 9 = \blacksquare 0$

3.  $1 \blacksquare \times 3 = 3$

$3 \div 3 = \blacksquare 1$

4.  $0 \blacksquare \times 1 = 0$

$0 \div 1 = \blacksquare 0$

5.  $1 \blacksquare \times 1 = 1$

$1 \div 1 = \blacksquare 1$

6.  $2 \blacksquare \times 1 = 2$

$2 \div 1 = \blacksquare 2$

7.  $0 \div 8 = \blacksquare 0$

8.  $0 \div 10 = \blacksquare 0$

9.  $0 \div 23 = \blacksquare 0$

10.  $8 \div 1 = \blacksquare 8$

11.  $10 \div 1 = \blacksquare 10$

12.  $23 \div 1 = \blacksquare 23$

**Using the Exercises**

- Questions 1 to 6 include a mixture of division facts with zero and one. Each question is written as a multiplication equation having a missing factor and as a division equation with an unknown quotient.
- Questions 7 to 9 have zero as a dividend.
- Questions 10 to 12 have one as a divisor.



# PRACTICE

Divide.

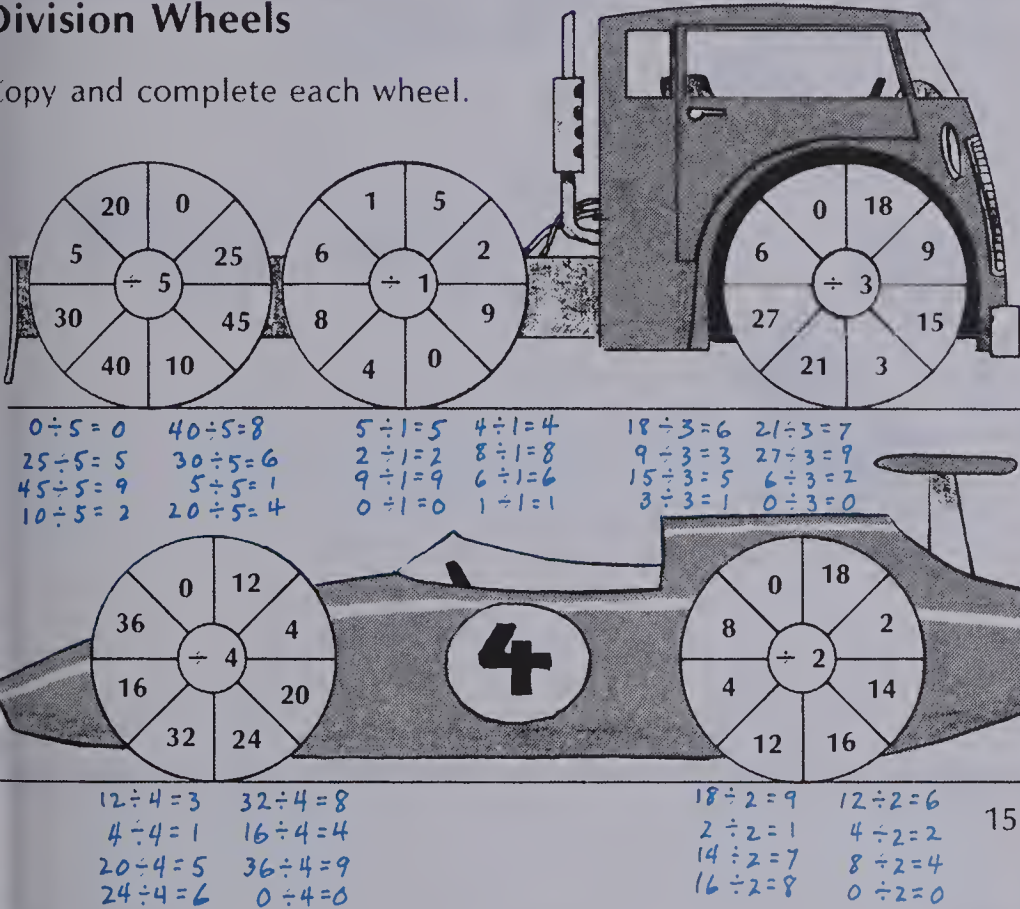
1.  $4 \div 1$  4    2.  $9 \div 1$  9    3.  $2 \div 1$  2    4.  $5 \div 1$  5  
5.  $0 \div 2$  0    6.  $0 \div 8$  0    7.  $0 \div 5$  0    8.  $0 \div 9$  0  
9.  $6 \div 6$  1    10.  $8 \div 1$  8    11.  $1 \div 1$  1    12.  $0 \div 1$  0

Solve.

13. 5 birds  
1 in each cage  
How many cages? **5**
14. Two children are to share  
the cookies, but none are left.  
How many for each child? **0**

## Division Wheels

Copy and complete each wheel.



## Extra Practice

ide.

3.  $3 \div 1 = \underline{3}$       2.  $6 \div 1 = \underline{6}$       3.  $8 \div 1 = \underline{8}$

0.  $0 \div 2 = \underline{0}$       5.  $0 \div 5 = \underline{0}$       6.  $0 \div 9 = \underline{0}$

4.  $4 \div 1 = \underline{4}$       8.  $0 \div 4 = \underline{0}$       9.  $8 \div 8 = \underline{1}$

Write the missing factor.

6  $\times 1 = 6$       11. 1  $\times 7 = 7$       12. 0  $\times 9 = 0$

0  $\times 8 = 0$       14. 5  $\times 1 = 5$       15. 0  $\times 1 = 0$

## Worksheet A34

Pages 154-155

## Assigning the Practice

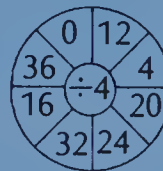
Minimum: 1-14

Average: 1-14

Enriched: 1-14

## Reinforcement

1. Assign *Division Wheels* on page 155. Wheels such as these can be made into cardboard spinners and used in a board game, “Division Driving”.



At the beginning of each turn, each player shakes a die marked—blank, 1, 2, 3, 4, and 5. If he or she shakes 4, then the “ $\div 4$ ” spinner is spun and the division equation must be correctly completed. The player then moves the marker the number of spaces that is the quotient. If a blank appears on the die, no moves are made. If an incorrect answer is given, no moves are made. The first person to reach the finish is the winner.

[illegible]

2. Prepare 25 cm  $\times$  30 cm story problem work cards. Ask the students to write the appropriate division equation for each. Include division facts with 0, 1, 2, 3, 4, and 5.

0 ice-cream scoops  
2 on each cone  
How many cones?

36 bananas  
4 in a bunch  
How many bunches?

## Enrichment

1. Investigate the properties of zero and one using equations with parentheses as shown in *Betty Brackets* on page 13.

$16 + (0 \div 4) = \blacksquare$	$25 + (5 \div 1) = \blacksquare$
$8 + (3 \div 3) = \blacksquare$	$14 + (3 \times 0) = \blacksquare$
$15 - (8 - 0) = \blacksquare$	$13 - (9 - 9) = \blacksquare$
$1 - (0 + 1) = \blacksquare$	$50 + (0 \div 5) = \blacksquare$

- 2.** Ask the students to list as many addition, subtraction, multiplication, and division names as they can for zero and for one.

Discuss the situations which have an infinite number of possibilities (subtracting a number from itself, dividing a number by itself, etc.).

# UNIT 8 LESSON 8

## Objective PS13

Choose the correct operation in solving a word problem.

## Introducing the Lesson

Review the meaning of each operation. Discuss examples for each.

- + combining, putting together
- taking away, finding a part
- × adding together equal groups
- ÷ separating into equal groups

## Teaching the Lesson

Work together the following *assumed information* problems.

5 tricycles finish.  
How many wheels in all?  
+ - × ÷

16 tires on bikes.  
How many bikes in all?  
+ - × ÷

8 people in 6 cars.  
How many more drivers than passengers?  
+ - × ÷

A car is carrying one bike and 2 tricycles.  
How many wheels in all?  
+ - × ÷

Help the students to add one sentence to each problem above so that no information is *hidden* or *assumed*. Warn the students that none of the information on page 156 is either extra or hidden—on their page every number is used.

## Enrichment

Assign the following assumed information problems.

9 bicycles fixed,  
How many wheels in all?

The cars on the ferry  
have 12 wheels.  
How many cars in all?

What things are seen? (*Hint*: cars, bicycles, tricycles)  
Bonnie sees 7 wheels.  
Harold sees 11 wheels.  
Sasha sees 13 wheels.  
JoJo sees 17 wheels.  
Fran sees 23 wheels.

# Choosing the OPerations

Pick the operation first. Then write the equation.



1. 5 4 wheels on each car  
How many wheels in all?  
+ - **×** ÷ **20**

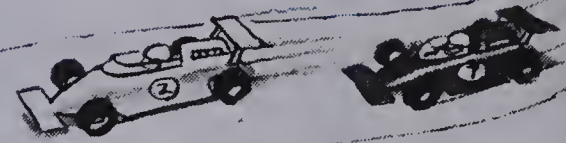
2. 12 wheels in all 4 on each   
How many cars?  
+ - × **÷** **3**

3. 13 racers 7 drop out.  
How many are left?  
+ **-** × ÷ **6**

4. 14 drivers 2 in each car  
How many cars?  
+ - × **÷** **7**

5. 7 new 8 old 6 very old   
How many cars in all?  
**+** - × ÷ **21**

6. 15 motorcycles start. 3 in each row  
How many rows?  
+ - × **÷** **5**



7. 20 people watch. 5 in each group  
How many groups?  
+ - × ÷

8. 12 drivers 3 on each team  
How many teams?  
+ - × **÷** **4**

9. 6 finish. 2 wheels on each  
How many wheels in all?  
+ - **×** ÷ **12**

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## Problem Solving Activities

Assign Level 3, Unit 8.



# Picturing Sets

Draw a picture, give an equation, and answer in a sentence.

1. A set of bicycles has 14 wheels in all.  
How many  are there? 7
2. A set of skateboards has 16 wheels in all.  
How many  are there? 4
3. A set of **triangles** has 12 sides in all.  
How many  $\triangle$  are there? 4
4. A set of **squares** has 20 sides in all.  
How many  $\square$  are there? 5



## REVIEW

Divide.

- |     |                          |                          |                          |                          |
|-----|--------------------------|--------------------------|--------------------------|--------------------------|
| A32 | 1. $27 \div 3$ <u>9</u>  | 2. $6 \div 3$ <u>2</u>   | 3. $12 \div 3$ <u>4</u>  | 4. $21 \div 3$ <u>7</u>  |
|     | 5. $3 \div 3$ <u>1</u>   | 6. $24 \div 3$ <u>8</u>  | 7. $18 \div 3$ <u>6</u>  | 8. $9 \div 3$ <u>3</u>   |
| A33 | 9. $16 \div 4$ <u>4</u>  | 10. $24 \div 4$ <u>6</u> | 11. $8 \div 4$ <u>2</u>  | 12. $4 \div 4$ <u>1</u>  |
|     | 13. $12 \div 4$ <u>3</u> | 14. $20 \div 4$ <u>5</u> | 15. $32 \div 4$ <u>8</u> | 16. $36 \div 4$ <u>9</u> |
| A34 | 17. $0 \div 8$ <u>0</u>  | 18. $0 \div 3$ <u>0</u>  | 19. $4 \div 1$ <u>4</u>  | 20. $6 \div 1$ <u>6</u>  |
|     | 21. $0 \div 2$ <u>0</u>  | 22. $5 \div 1$ <u>5</u>  | 23. $9 \div 1$ <u>9</u>  | 24. $0 \div 9$ <u>0</u>  |

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## Extra Practice

- Mary had 45¢ in nickels.  
How many nickels did she have? 9
- The Bicycle Shop put new tires on 6 used bikes.  
How many tires did they use? 12
- Jo has a bicycle and an old tricycle.  
How many wheels does she have? 5
- Joan has 18¢ in dimes, nickels, and pennies.  
How many pennies does she have? 3

## Worksheet PS13-PS14

Pages 156-157

## Objective PS14

Supply an assumed number to solve a problem.

## Teaching the Lesson

Find the assumed numbers to solve these division problems. Carefully show the students how to follow the directions on page 157. To emphasize the assumed number, underline it in the equation.

### Problems

Mary has 30¢ in nickels.  
How many nickels did she have?

### Solutions



$$30 \div 5 = 6$$

Mary had 6 nickels.

A set of rectangles has 24 sides in all.  
How many rectangles are there?

$$24 \div 4 = 6$$

$\square\square\square\square\square\square$  There are 6 rectangles.

## Reinforcement

List things that suggest numbers. Justify each choice.

square, rectangle, triangle  
nickel, dime, quarter  
centipede, horse, duck  
metre, decimetre, kilometre

## Enrichment

1. Allow the students to write division questions for which one number is not stated but assumed. To start, use the list from the Reinforcement section.

2. Discuss trickier problems involving missing information. Warn the students that people often assume information that is not intended; tests and textbooks usually don't.

Bill has 30¢.

How many nickels?

*2 nickels and 2 dimes or 1 nickel and 1 quarter or 6 nickels*

Three figures have 12 sides in all.

How many rectangles are there?

Maybe none:  $\triangle$   $\triangle$   $\square$

## Review Exercises

Questions	Objective	Pages
1-8	A32	150-151
9-16	A33	152-153
17-24	A34	154-155

Unit 8 Objective	Test Questions	Pages
A28	1-4	142-143
A29	5-8	144-145
A30	9-16	146-147
A31	17-24	148-149
A32	25-32	150-151
A33	33-40	152-153
A34	41-44	154-155
PS	45-46	

# TEST

# UNIT 8

Draw a picture to show groups of:

1. 3 in 18 6    2. 2 in 18 9    3. 4 in 12 3    4. 5 in 20 4

Copy and complete.

5.  $3 \times 5 = \blacksquare$  15

$15 \div 5 = \blacksquare$  3

7.  $6 \blacksquare \times 3 = 18$

$18 \div 3 = \blacksquare$  6

6.  $2 \times 3 = \blacksquare$  6

$6 \div 3 = \blacksquare$  2

8.  $2 \blacksquare \times 4 = 8$

$8 \div 4 = \blacksquare$  2

Divide.

9.  $14 \div 2$  7    10.  $10 \div 2$  5    11.  $2 \div 2$  1    12.  $18 \div 2$  9

13.  $4 \div 2$  2    14.  $12 \div 2$  6    15.  $16 \div 2$  8    16.  $8 \div 2$  4

17.  $40 \div 5$  8    18.  $5 \div 5$  1    19.  $30 \div 5$  6    20.  $25 \div 5$  5

21.  $45 \div 5$  9    22.  $15 \div 5$  3    23.  $20 \div 5$  4    24.  $35 \div 5$  7

25.  $21 \div 3$  7    26.  $3 \div 3$  1    27.  $27 \div 3$  9    28.  $9 \div 3$  3

29.  $24 \div 3$  8    30.  $18 \div 3$  6    31.  $6 \div 3$  2    32.  $15 \div 3$  5

33.  $32 \div 4$  8    34.  $36 \div 4$  9    35.  $28 \div 4$  7    36.  $16 \div 4$  4


37.  $12 \div 4$  3    38.  $8 \div 4$  2    39.  $20 \div 4$  5    40.  $24 \div 4$  6

41.  $0 \div 3$  0    42.  $5 \div 1$  5    43.  $1 \div 1$  1    44.  $0 \div 1$  0


Solve.


45. 24 children

4 in each 

How many  6

46. 30 children

6 in each 

How many  ? 5

## Post-test

Unit

Complete.

1.  $18 \div 2 =$  9

2.  $18 \div 3 =$  6

3. 2  $\times 9 = 18$

4.  $18 \div 9 =$  2

5.  $3 \times 4 =$  12

6.  $12 \div 4 =$  3

7.  $3 \times 3 =$  9

8.  $9 \div 3 =$  3

9.  $18 \div 2 =$  9

10.  $2 \div 2 =$  1

11.  $10 \div 2 =$  5

12.  $14 \div 2 =$  7

13.  $8 \div 2 =$  4

14.  $16 \div 2 =$  8

15.  $12 \div 2 =$  6

16.  $4 \div 2 =$  2

17.  $25 \div 5 =$  5

18.  $30 \div 5 =$  6

19.  $10 \div 5 =$  2

20.  $40 \div 5 =$  8

21.  $35 \div 5 =$  7

22.  $20 \div 5 =$  4

23.  $15 \div 5 =$  3

24.  $45 \div 5 =$  9



## MULTIPLICATION

Complete the patterns.

1. 3, 6,  $\blacksquare$ ,  $\blacksquare$  2. 20, 25,  $\blacksquare$ ,  $\blacksquare$  3. 10, 12,  $\blacksquare$ ,  $\blacksquare$

Copy the correct numerals in the blanks.

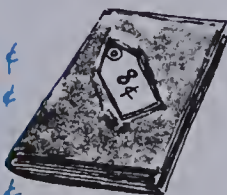
4.  $2 + 2 + 2 = \blacksquare$  5.  $3 \times 2 = \blacksquare$  6.  $3 + 3 = \blacksquare$   
 7.  $2 \times 3 = \blacksquare$  8.  $4 + 4 + 4 + 4 = \blacksquare$  9.  $4 \times \blacksquare = 16$   
 10.  $5 + 5 + 5 = \blacksquare$  11.  $\blacksquare \times 5 = 15$  12.  $2 \times 9 = 9 \times \blacksquare$

Multiply.

13.  $4 \times 3$  14.  $3 \times 4$  15.  $5 \times 2$  16.  $2 \times 5$   
 17.  $2 \times 6$  18.  $2 \times 7$  19.  $2 \times 8$  20.  $2 \times 9$   
 21.  $2 \times 0$  22.  $2 \times 1$  23.  $2 \times 2$  24.  $2 \times 3$   
 25.  $4 \times 5$  26.  $5 \times 5$  27.  $6 \times 5$  28.  $7 \times 5$   
 29.  $8 \times 5$  30.  $9 \times 5$  31.  $0 \times 5$  32.  $1 \times 5$   
 33.  $4 \times 3$  34.  $5 \times 3$  35.  $6 \times 3$  36.  $7 \times 3$   
 37.  $0 \times 3$  38.  $1 \times 3$  39.  $2 \times 3$  40.  $3 \times 3$   
 41.  $4 \times 6$  42.  $4 \times 7$  43.  $4 \times 8$  44.  $4 \times 9$   
 45.  $2 \times 4$  46.  $3 \times 4$  47.  $4 \times 4$  48.  $5 \times 4$

Solve.

49. How much will it cost to buy 2 books? 16¢  
 3 books? 24¢  
 4 books? 32¢  
 5 books? 40¢



- 3  $\div$  3 = 1 26. 27  $\div$  3 = 9 27. 12  $\div$  3 = 4 28. 21  $\div$  3 = 7  
 15  $\div$  3 = 5 30. 6  $\div$  3 = 2 31. 24  $\div$  3 = 8 32. 18  $\div$  3 = 6  
 16  $\div$  4 = 4 34. 36  $\div$  4 = 9 35. 28  $\div$  4 = 7 36. 36  $\div$  9 = 4  
 20  $\div$  4 = 5 38. 24  $\div$  4 = 6 39. 8  $\div$  4 = 2 40. 12  $\div$  4 = 3  
 9  $\div$  1 = 9 42. 0  $\div$  8 = 0 43. 0  $\div$  1 = 0 44. 5  $\div$  1 = 5

10 motorcycles

How many wheels? 20

46. 8 triangles

How many sides? 24

# UNIT 9

## Addition II

Theme: A Saturday

Lesson		Objective	Vocabulary	Materials
Preview		Add two-digit addends.		
1	A35	Add 2 three-digit addends, regrouping ones.	add hundreds, trade or regroup ones	
2	A36	Add 2 three-digit addends, regrouping tens.	trade or regroup tens	number blocks, addition grids
3	A37	Add 2 three-digit addends with regrouping.	two trades	number blocks, addition grids, tangram puzzles
4	A38	Add 3 two-digit addends with regrouping.	three addends, regroup 20 ones	pennies, dimes, dollars, addition grids
5	A39	Add 3 three-digit addends.	regroup 20 tens, trading decision	pennies, dimes, dollars, addition grids
6	N9	Round a numeral to the nearest ten or the nearest hundred.	round to the nearest ten, round to the nearest hundred	number line
7	A40	Estimate sums of two-digit and three-digit addends.	estimate sums, check sums	
8	PS15	Count on using coins.	nickel, quarter, cost, change, paid	pennies, dimes, nickels, quarters, and dollars
	PS16	Make change to \$5.00.	make change	bills
Test		Three-digit addition		
Review		Multiplication facts		



# About This Unit

Unit 9, Addition II, consists of a thorough, step-by-step treatment of three-digit addition skills. As such, it builds upon the concepts and skills developed in Unit 4, Addition. The use of manipulative materials, primarily number blocks, coins, and mass sets is recommended in the teaching suggestions and is explicitly illustrated for several lessons. Upon completing this unit, most students should be competent with an addition procedure requiring basic facts recall. The students' progress with the basic facts program may be monitored using their Addition Fact Master (see Unit 4).

Three skills areas are integrated within this unit's step-by-step approach. These areas should be stressed through discussion as well as reinforced through practice.

1. The student needs to recall basic addition facts accurately and quickly.
2. The student needs to trade (regroup) accurately and with understanding of place value.
3. The student needs to align numerals for addition properly and to record the process neatly and accurately.

$$\begin{array}{r} 638 \\ +327 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 1 \\ 638 \\ +327 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 638 \\ +327 \\ \hline \end{array}$$

Facts recall

Regrouping

Proper alignment

In checking assignments, be aware of the types of errors being made. Error analysis and appropriate remediation is vital for effective and efficient treatment of deficiencies.

Several important, practical features are found in this unit.

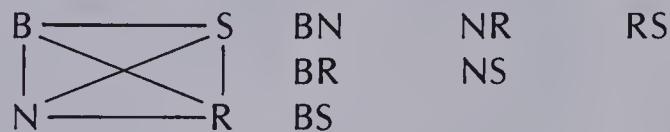
1. Students are introduced to a method for estimating sums involving rounding.
2. Mental arithmetic exercises are included in the test and in the *Teacher's Resource Book*.
3. Making change is treated as the culmination of exercises involving mentally *counting on* using coins and *guessing and testing* various combinations of change.
4. Students are shown how to calculate the mass of objects using traditional mass sets.
5. The addition of three addends is introduced using materials where trades of 20 ones and 20 tens are possible.

# Ideas

Unit 9 shows the Saturday activities of two young students, Kim and Skip, as they work, play, and visit a circus in a nearby city. Two mathematical subthemes are developed within this unit: listing all possible pairs of a set and working with money.

## 1. Pairs

B, S, N, and R sat together at the circus. Two of them are friends. Who could they be?



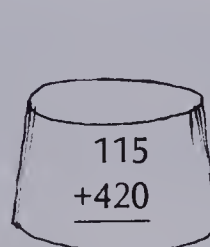
## 2. Making change

Skip paid \$5.00 for a \$3.65 book. Is the change correct?



# Activities

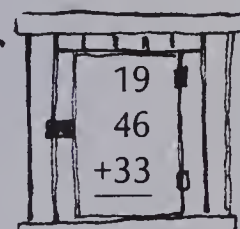
1. Have volunteers write short chapters describing what Kim and Skip are doing or seeing in each lesson. Put the chapters together into a book.
2. Use circus shapes for addition work cards.



Stand



Tent



Cage

3. Ten metre sticks laid end-to-end can serve as a handy number line to 1000 if extra labels are used. Have the students do these kinds of problems using the number line to 1000.

$$738 + 9$$

$$469 + 8$$

$$235 + 100$$

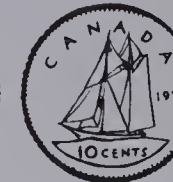
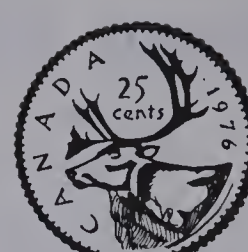
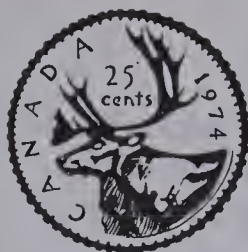
4. Relate these three ways of adding. Compare the trading (regrouping) that occurs in each.

$$\begin{array}{r} 11 \\ 268 \\ +159 \\ \hline 427 \end{array}$$

2	6	8
+1	5	9
3	11	17
3	12	7
4	2	7

$$\begin{array}{r} 268 \\ +159 \\ \hline 17 \\ 110 \\ 300 \\ \hline 427 \end{array}$$





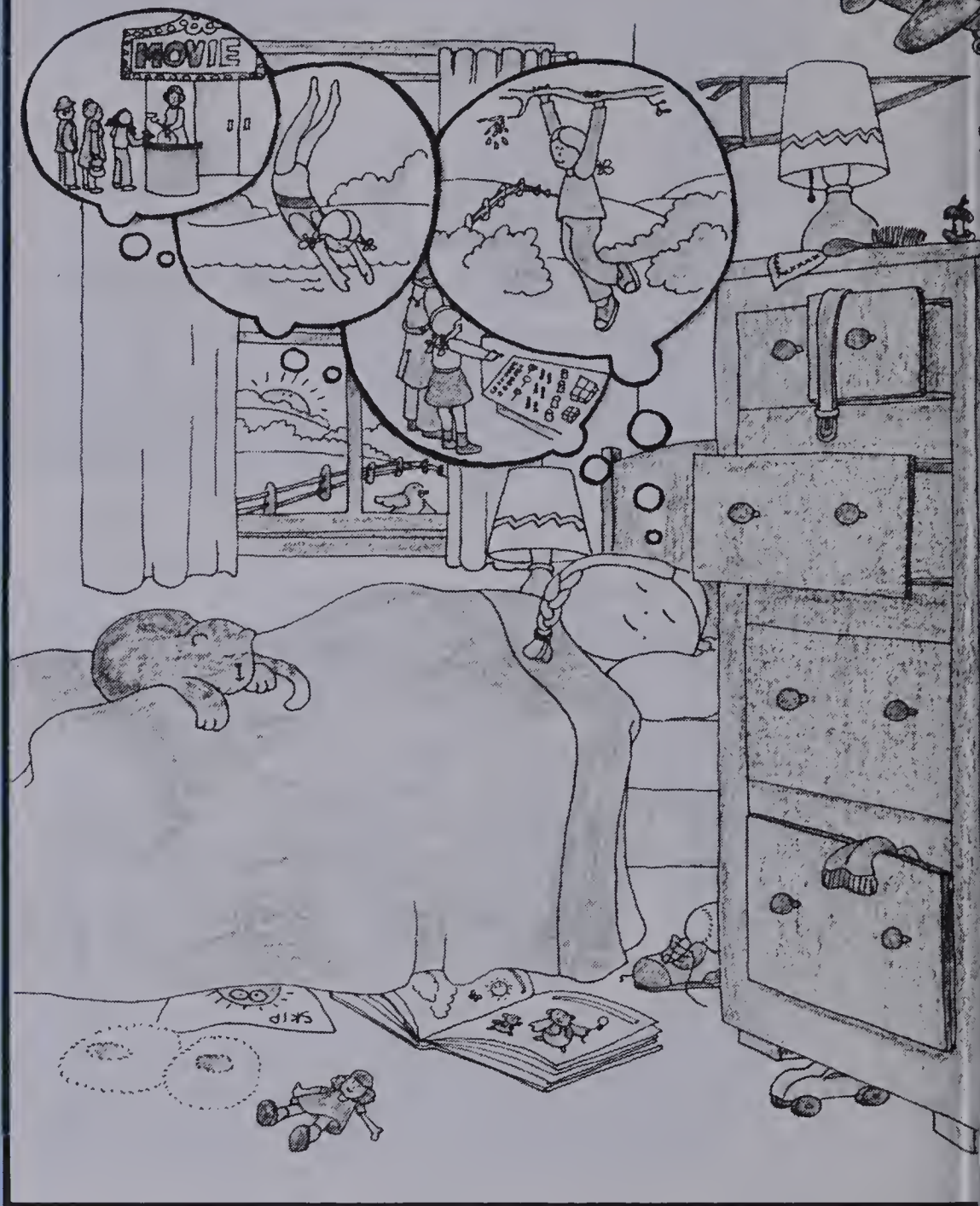






# UNIT 9

## ADDITION II



Unit 9 Objectives	Test Questions	Pages
A35	1-4	162-163
A36	5-8	164-165
A37	9-12	166-167
A38	13-16	168-169
A39	17-20	170-171
N9	21-24	172-173
A40	25-28	174-175

Pretest			Unit
Add.			
1. 264 + 713 — 977	2. 175 + 205 — 380	3. 317 + 476 — 793	4. 328 + 519 — 847
5. 276 + 592 — 868	6. 694 + 54 — 748	7. 273 + 126 — 399	8. 368 + 371 — 739
9. 297 + 186 — 483	10. 589 + 349 — 938	11. 475 + 276 — 751	12. 165 + 135 — 300
13. 45 23 + 82 — 150	14. 67 95 + 48 — 210	15. 23 37 + 86 — 146	16. 46 29 + 88 — 163



# Weekend Homework

Kim and Skip finish their homework.



Due Monday

1. $\begin{array}{r} 35 \\ +44 \\ \hline 79 \end{array}$	2. $\begin{array}{r} 72 \\ +9 \\ \hline 81 \end{array}$	3. $\begin{array}{r} 84 \\ +52 \\ \hline 136 \end{array}$	4. $\begin{array}{r} 58 \\ +68 \\ \hline 126 \end{array}$	5. $\begin{array}{r} 75 \\ +22 \\ \hline 97 \end{array}$
6. $\begin{array}{r} 35 \\ +7 \\ \hline 42 \end{array}$	7. $\begin{array}{r} 74 \\ +74 \\ \hline 148 \end{array}$	8. $\begin{array}{r} 93 \\ +99 \\ \hline 192 \end{array}$	9. $\begin{array}{r} 63 \\ +67 \\ \hline 130 \end{array}$	10. $\begin{array}{r} 18 \\ +48 \\ \hline 66 \end{array}$
$\begin{array}{r} 85 \\ +75 \\ \hline 160 \end{array}$	12. $\begin{array}{r} 66 \\ +37 \\ \hline 103 \end{array}$	13. $\begin{array}{r} 94 \\ +8 \\ \hline 102 \end{array}$	14. $\begin{array}{r} 53 \\ +78 \\ \hline 131 \end{array}$	

Kim

Due Monday

$\begin{array}{r} 45 \\ +86 \\ \hline 131 \end{array}$	2. $\begin{array}{r} 56 \\ +46 \\ \hline 102 \end{array}$	3. $\begin{array}{r} 70 \\ +33 \\ \hline 103 \end{array}$	4. $\begin{array}{r} 87 \\ +73 \\ \hline 160 \end{array}$	5. $\begin{array}{r} 27 \\ +39 \\ \hline 66 \end{array}$
$\begin{array}{r} 88 \\ +42 \\ \hline 130 \end{array}$	7. $\begin{array}{r} 95 \\ +97 \\ \hline 192 \end{array}$	8. $\begin{array}{r} 86 \\ +62 \\ \hline 148 \end{array}$	9. $\begin{array}{r} 37 \\ +5 \\ \hline 42 \end{array}$	10. $\begin{array}{r} 77 \\ +20 \\ \hline 97 \end{array}$
$\begin{array}{r} 47 \\ +79 \\ \hline 126 \end{array}$	12. $\begin{array}{r} 46 \\ +90 \\ \hline 136 \end{array}$	13. $\begin{array}{r} 34 \\ +47 \\ \hline 81 \end{array}$	14. $\begin{array}{r} 12 \\ +67 \\ \hline 79 \end{array}$	

Skip



## UNIT 9 PREVIEW

### Suggestions

Review two-digit addition using the following examples. Compare and contrast the trading steps performed for each.

$\begin{array}{r} 35 \\ +63 \\ \hline \end{array}$	$\begin{array}{r} 49 \\ +4 \\ \hline \end{array}$	$\begin{array}{r} 83 \\ +82 \\ \hline \end{array}$	$\begin{array}{r} 59 \\ +71 \\ \hline \end{array}$
$\begin{array}{r} 20 \\ +45 \\ \hline \end{array}$	$\begin{array}{r} 12 \\ +68 \\ \hline \end{array}$	$\begin{array}{r} 35 \\ +72 \\ \hline \end{array}$	$\begin{array}{r} 87 \\ +78 \\ \hline \end{array}$

### About the Page

The theme of Unit 9 involves following the Saturday activities of Grade 3 students Kim and Skip. Discuss the illustration on page 160 starting with these questions.

“What day of the week do you think it is?”

“Why is Kim having these kinds of dreams?”

“What do Kim and Skip have to do before playing?”

As the assignments are completed, let the students help you mark the work. The sums for the problems of the two sections match in reverse order. (Kim’s #1 and Skip’s #14 both equal 79, and so on.)

### Reinforcement

Assign the following chalkboard or worksheet examples.

a. $\begin{array}{r} 65 \\ +49 \\ \hline \end{array}$	b. $\begin{array}{r} 26 \\ +24 \\ \hline \end{array}$	c. $\begin{array}{r} 51 \\ +38 \\ \hline \end{array}$
d. $\begin{array}{r} 77 \\ +62 \\ \hline \end{array}$	e. $\begin{array}{r} 36 \\ +52 \\ \hline \end{array}$	f. $\begin{array}{r} 90 \\ +89 \\ \hline \end{array}$
g. $\begin{array}{r} 45 \\ +45 \\ \hline \end{array}$	h. $\begin{array}{r} 22 \\ +83 \\ \hline \end{array}$	i. $\begin{array}{r} 29 \\ +44 \\ \hline \end{array}$

### Enrichment

Have the students make a list of Saturday activities. Sort the activities in the list into separate sets and subsets which are named.

Weekend activities:

1. Work ➡ Easy or Hard

2. Play ➡ Free or Expensive

$\begin{array}{r} 367 \\ 184 \\ +395 \\ \hline 946 \end{array}$	18. $\begin{array}{r} 136 \\ 478 \\ +219 \\ \hline 833 \end{array}$	19. $\begin{array}{r} 346 \\ 227 \\ +182 \\ \hline 755 \end{array}$	20. $\begin{array}{r} 164 \\ 599 \\ +138 \\ \hline 901 \end{array}$
---	---	---	---

Round to the nearest hundred.

$\begin{array}{r} 73 \\ 100 \end{array}$	22. $\begin{array}{r} 426 \\ 400 \end{array}$	23. $\begin{array}{r} 765 \\ 800 \end{array}$	24. $\begin{array}{r} 292 \\ 300 \end{array}$
--	---	---	---

Estimate the sum.

$\begin{array}{r} 421 \\ +117 \\ \hline 500 \end{array}$	26. $\begin{array}{r} 675 \\ +19 \\ \hline 700 \end{array}$	27. $\begin{array}{r} 814 \\ +109 \\ \hline 900 \end{array}$	28. $\begin{array}{r} 663 \\ +298 \\ \hline 1000 \end{array}$
--	---	--	---

## Objective A35

Add 2 three-digit addends, regrouping ones.

## Introducing the Lesson

Watching TV on Saturday morning is a common student pastime. Ask the students what is new or different about the information on the TV screen on page 162. (Adding numbers in the hundreds.) If they were cartoon writers and artists, how would they put this idea into a cartoon?

## Teaching the Lesson

Use a practical problem to introduce the lesson such as:

On Saturday, Kim watched one TV show which was 104 minutes long and another one that was 119 minutes long. What was the total number of minutes of the two shows?

Discuss and relate the following examples.

3 hundreds	300	3 42
+2 hundreds	+200	+2 05
5 hundreds	500	■ 47
		■
3 hundreds	300	2 56
+5 hundreds	+500	+5 36
8 hundreds	800	■ ■ 2

Remind the students to watch for trading from the ones place. Have them circle the problems that require trading, then add.

382	657	469
+414	+215	+ 29
706	835	564
+ 92	+ 8	+ 7

# Adding Hundreds

Add ones. Trade?

$$\begin{array}{r} 342 \\ + 205 \\ \hline 547 \end{array}$$

$$\begin{array}{r} 256 \\ + 536 \\ \hline 792 \end{array}$$

Add tens.

$$\begin{array}{r} 342 \\ + 205 \\ \hline 47 \end{array}$$

$$\begin{array}{r} 256 \\ + 536 \\ \hline 92 \end{array}$$

Add hundreds.

$$\begin{array}{r} 342 \\ + 205 \\ \hline 547 \end{array}$$

$$\begin{array}{r} 256 \\ + 536 \\ \hline 792 \end{array}$$

Saturday Morning Cartoons

## EXERCISES

Finish adding.

- $$\begin{array}{r} 235 \\ + 624 \\ \hline \end{array}$$
- $$\begin{array}{r} 360 \\ + 412 \\ \hline \end{array}$$
- $$\begin{array}{r} 735 \\ + 262 \\ \hline \end{array}$$
- $$\begin{array}{r} 740 \\ + 27 \\ \hline \end{array}$$
- $$\begin{array}{r} 635 \\ + 104 \\ \hline \end{array}$$
- $$\begin{array}{r} 352 \\ + 249 \\ \hline \end{array}$$
- $$\begin{array}{r} 352 \\ + 247 \\ \hline \end{array}$$
- $$\begin{array}{r} 587 \\ + 108 \\ \hline \end{array}$$
- $$\begin{array}{r} 587 \\ + 102 \\ \hline \end{array}$$
- $$\begin{array}{r} 108 \\ + 82 \\ \hline \end{array}$$
- $$\begin{array}{r} 254 \\ + 437 \\ \hline \end{array}$$
- $$\begin{array}{r} 254 \\ + 433 \\ \hline \end{array}$$
- $$\begin{array}{r} 309 \\ + 608 \\ \hline \end{array}$$
- $$\begin{array}{r} 301 \\ + 608 \\ \hline \end{array}$$

## Using the Exercises

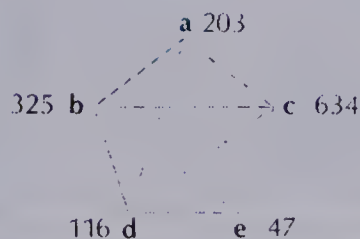
- Questions 1 to 5 require no regrouping.
- Questions 6 to 15 consist of three-digit addition with and without regrouping. Check the students' work for proper number alignment.



## PRACTICE

Add.

1.  $\begin{array}{r} 265 \\ + 426 \\ \hline 691 \end{array}$
2.  $\begin{array}{r} 347 \\ + 343 \\ \hline 690 \end{array}$
3.  $\begin{array}{r} 928 \\ + 61 \\ \hline 989 \end{array}$
4.  $\begin{array}{r} 368 \\ + 502 \\ \hline 870 \end{array}$
5.  $\begin{array}{r} 204 \\ + 788 \\ \hline 992 \end{array}$
6.  $\begin{array}{r} 736 \\ + 54 \\ \hline 790 \end{array}$
7.  $\begin{array}{r} 223 \\ + 769 \\ \hline 992 \end{array}$
8.  $\begin{array}{r} 839 \\ + 109 \\ \hline 948 \end{array}$
9.  $\begin{array}{r} 974 \\ + 24 \\ \hline 998 \end{array}$
10.  $\begin{array}{r} 311 \\ + 479 \\ \hline 790 \end{array}$
11.  $\begin{array}{r} 727 \\ + 267 \\ \hline 994 \end{array}$
12.  $\begin{array}{r} 680 \\ + 310 \\ \hline 990 \end{array}$
13.  $\begin{array}{r} 609 \\ + 101 \\ \hline 710 \end{array}$
14.  $\begin{array}{r} 300 \\ + 500 \\ \hline 800 \end{array}$
15.  $\begin{array}{r} 886 \\ + 108 \\ \hline 994 \end{array}$
16. a and b **528**
17. a plus c **837**
18. a and d **319**
19. a plus e **250**
20. b and c **959**
21. b plus d **441**
22. b and e **372**
23. c plus d **750**
24. c and e **681**
25. d plus e **163**



## Video Games

How many thousands?

1. 3625 **3**
2. 9200 **9**
3. 352 **0**
4. **2**

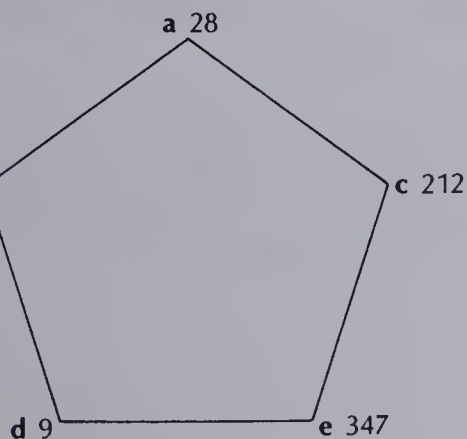
Write in standard form.

5. two thousand one hundred **2100**
6. four thousand sixteen **4016**
7. nine thousand three **9003**
8. **3123**

## Extra Practice

Find ten pairs of numbers. Add each pair. What's ten problems!

1.  $28 + 603 = 631$
2.  $28 + 9 = 37$
3.  $603 + 212 = 815$
4.  $603 + 347 = 950$
5.  $212 + 347 = 559$



## Worksheet A35

Pages 162-163

2.  $28 + 212 = 240$
4.  $28 + 347 = 375$
6.  $603 + 9 = 612$
8.  $212 + 9 = 221$
10.  $9 + 347 = 356$

## Assigning the Practice

Minimum: 1-20

Average: 1-25

Enriched: 1-25

## Reinforcement

1. Before assigning *Video Games* on page 163, review the numeration skills required, particularly translating from written form to standard form.

2. Introduce and practise the following addition technique. Compare and relate this method to that used in the textbook.

$\begin{array}{r} 356 \\ + 226 \\ \hline 582 \end{array}$	$\begin{array}{r} 657 \\ + 307 \\ \hline 964 \end{array}$	$\begin{array}{r} 467 \\ + 9 \\ \hline 476 \end{array}$	$\begin{array}{r} 704 \\ + 8 \\ \hline 712 \end{array}$
---	---	---	---

## Enrichment

1. Find the missing numbers.

a. $\begin{array}{r} \blacksquare 36 \\ + 1 \blacksquare 2 \\ \hline 64 \blacksquare \end{array}$	b. $\begin{array}{r} \blacksquare 49 \\ + 6 \blacksquare 2 \\ \hline 98 \blacksquare \end{array}$	c. $\begin{array}{r} 35 \blacksquare \\ + 5 \blacksquare 2 \\ \hline \blacksquare 87 \end{array}$
---	---	---

2. Make a TV from a cardboard box, butcher paper, and wooden rollers. Use the TV to document field trips, stories, and television plays utilizing half-and-half ruled exercise booklet pages. Use the same format to generate TV addition cartoons.



3. If possible, borrow a micro computer with drill and practice programs involving addition of three-digit numbers. If necessary, call the nearest secondary school for assistance.

# UNIT 9 LESSON 2

## Objective A36

Add 2 three-digit addends, regrouping tens.

## Introducing the Lesson

Say, "Skip has made a trading post from blankets and cardboard boxes. Help him and Kim complete the following trades."

- ones = 1 ten
- pennies = 1 dime
- cm = 1 dm
- tens = 1 hundred
- dimes = 1 dollar
- dm = 1 m

## Teaching the Lesson

Discuss the addition exercises presented on page 164. Stress the various decisions to be made regarding regrouping tens.

$$\begin{array}{r} 362 \\ + 132 \\ \hline \end{array}$$

$$\begin{array}{r} 463 \\ + 261 \\ \hline \end{array}$$

Have the students separate these problems into two types: those requiring regrouping in the tens and those not.

$$\begin{array}{r} 478 \\ + 50 \\ \hline \end{array}$$

$$\begin{array}{r} 362 \\ + 147 \\ \hline \end{array}$$

$$\begin{array}{r} 637 \\ + 241 \\ \hline \end{array}$$

$$\begin{array}{r} 654 \\ + 52 \\ \hline \end{array}$$

Ask someone to model an addition question using number blocks on an addition grid. (This procedure is explained in Unit 4 of this *Teacher's Resource Book*.)

$$\begin{array}{r} 478 \\ + 50 \\ \hline \end{array}$$



# Trading Tens

Skip's Trading Post

Add tens.  
Trade?

Add hundreds.

$$\begin{array}{r} 362 \\ + 132 \\ \hline 94 \end{array}$$

$$\begin{array}{r} 362 \\ + 132 \\ \hline 494 \end{array}$$

Kim knows  
10 tens = 1 hundred.

$$\begin{array}{r} 1 \\ 463 \\ + 261 \\ \hline 24 \end{array}$$

$$\begin{array}{r} 1 \\ 463 \\ + 261 \\ \hline 724 \end{array}$$

## EXERCISES

Finish adding.

$$\begin{array}{r} 1 \\ 432 \\ + 184 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ 670 \\ + 275 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \\ 587 \\ + 282 \\ \hline \end{array}$$

$$\begin{array}{r} 320 \\ + 420 \\ \hline \end{array}$$

$$\begin{array}{r} 742 \\ + 142 \\ \hline \end{array}$$

$$\begin{array}{r} 273 \\ + 343 \\ \hline \end{array}$$

$$\begin{array}{r} 393 \\ + 552 \\ \hline \end{array}$$

$$\begin{array}{r} 779 \\ + 90 \\ \hline \end{array}$$

$$\begin{array}{r} 700 \\ + 40 \\ \hline \end{array}$$

$$\begin{array}{r} 210 \\ + 674 \\ \hline \end{array}$$

$$\begin{array}{r} 372 \\ + 557 \\ \hline \end{array}$$

$$\begin{array}{r} 682 \\ + 75 \\ \hline \end{array}$$

$$\begin{array}{r} 542 \\ + 147 \\ \hline \end{array}$$

$$\begin{array}{r} 364 \\ + 35 \\ \hline \end{array}$$

$$\begin{array}{r} 65 \\ + 340 \\ \hline \end{array}$$

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## Using the Exercises

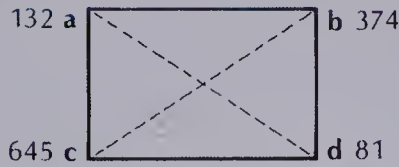
- Questions 1 to 5 involve the addition of hundreds with cues provided.
- Questions 6 to 10 involve the addition of tens and hundreds with cues provided.
- Questions 11 to 15 include problems with and without regrouping from the tens place. For students having difficulty, assess the type of addition error they are making (as explained in the introduction to this unit) and provide remedial assistance.



## PRACTICE

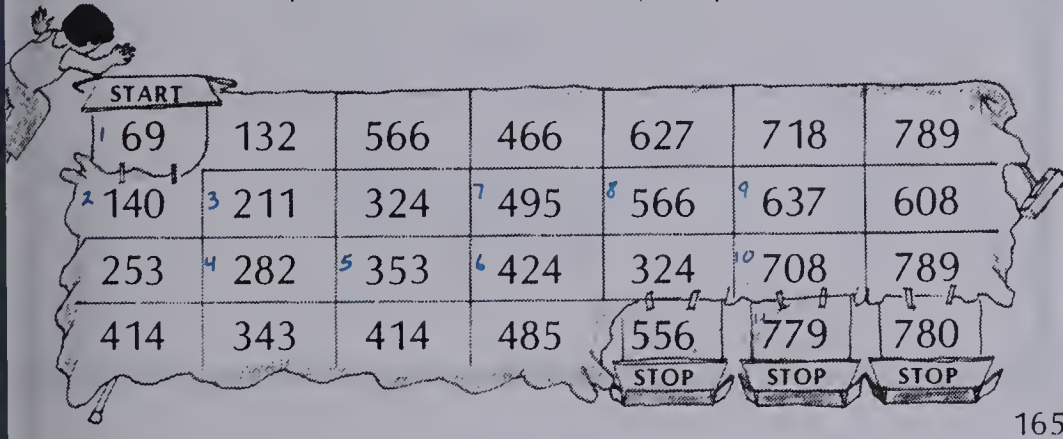
Add.

1.  $\begin{array}{r} 364 \\ + 353 \\ \hline 717 \end{array}$
2.  $\begin{array}{r} 589 \\ + 220 \\ \hline 809 \end{array}$
3.  $\begin{array}{r} 402 \\ + 597 \\ \hline 999 \end{array}$
4.  $\begin{array}{r} 375 \\ + 624 \\ \hline 999 \end{array}$
5.  $\begin{array}{r} 600 \\ + 75 \\ \hline 675 \end{array}$
6.  $\begin{array}{r} 721 \\ + 88 \\ \hline 809 \end{array}$
7.  $\begin{array}{r} 388 \\ + 110 \\ \hline 498 \end{array}$
8.  $\begin{array}{r} 645 \\ + 80 \\ \hline 725 \end{array}$
9.  $\begin{array}{r} 103 \\ + 306 \\ \hline 409 \end{array}$
10.  $\begin{array}{r} 224 \\ + 494 \\ \hline 718 \end{array}$
11.  $\begin{array}{r} 863 \\ + 130 \\ \hline 993 \end{array}$
12.  $\begin{array}{r} 759 \\ + 170 \\ \hline 929 \end{array}$
13.  $\begin{array}{r} 350 \\ + 359 \\ \hline 709 \end{array}$
14.  $\begin{array}{r} 277 \\ + 672 \\ \hline 949 \end{array}$
15.  $\begin{array}{r} 833 \\ + 95 \\ \hline 928 \end{array}$
16.  $\begin{array}{r} 265 \\ + 700 \\ \hline 965 \end{array}$
17.  $\begin{array}{r} 437 \\ + 480 \\ \hline 917 \end{array}$
18.  $\begin{array}{r} 891 \\ + 98 \\ \hline 989 \end{array}$
19.  $\begin{array}{r} 654 \\ + 182 \\ \hline 836 \end{array}$
20.  $\begin{array}{r} 163 \\ + 772 \\ \hline 935 \end{array}$
21.  $a + b$   
 $\begin{array}{r} 506 \\ + 277 \\ \hline 783 \end{array}$
22.  $a + c$   
 $\begin{array}{r} 777 \\ + 1019 \\ \hline 1796 \end{array}$
23.  $a + d$   
 $\begin{array}{r} 213 \\ + 455 \\ \hline 668 \end{array}$
24.  $b + c$   
 $\begin{array}{r} 777 \\ + 1019 \\ \hline 1796 \end{array}$
25.  $b + d$   
 $\begin{array}{r} 455 \\ + 777 \\ \hline 1232 \end{array}$
26.  $c + d$   
 $\begin{array}{r} 1019 \\ + 1796 \\ \hline 2815 \end{array}$



## A-mazing

Add 71 at each step. List the numbers in your path.



165

## Assigning the Practice

Minimum: 1-20

Average: 1-22

Enriched: 1-26

## Reinforcement

1. Discuss the *A-mazing* addition path on page 165 before the students work on it. Explain that they will find a pathway, formed by the sums, to one of the three stops.

2. Tell the students to watch the sum get larger! Add and keep adding on.

- a.  $71 \rightarrow 62 \rightarrow 380 \rightarrow 112 = ?$
- b.  $152 \rightarrow 72 \rightarrow 290 \rightarrow 304 = ?$
- c.  $7 \rightarrow 1 \rightarrow 400 \rightarrow 146 = ?$

3. For students encountering difficulty with the trading procedure, try using lattices. The student recounts addition problems as shown. The largest number acceptable in each slot is 9.

$$\begin{array}{r} 6 \ 3 \ 2 \\ + 1 \ 8 \ 4 \\ \hline 7 \ 11 \ 6 \end{array} \rightarrow \begin{array}{r} 1 \ 3 \ 2 \\ 6 \ 3 \ 2 \\ + 1 \ 8 \ 4 \\ \hline 8 \ 1 \ 6 \end{array}$$

## Enrichment

1. Provide 5 by 5 grids for the students to devise their own addition mazes. The stepping number (e.g., 71 in *A-mazing* on page 165) should have a ones-place digit of 0 or 1 until Lesson 3. Have the students complete a path first and then neatly fill in the grid with suitable distractors.

2. Explain that three students can be paired in these ways: AB, AC, and BC.



Ask:

a. In how many ways can five students be paired? six students? seven students? eight students?

b. Two different crayons are left from a box of eight colours. Have the students draw a diagram showing all possible leftovers.

## Extra Practice

Find twelve pairs of numbers. Add each pair. List the sums.

$$90 + 351 = 441$$

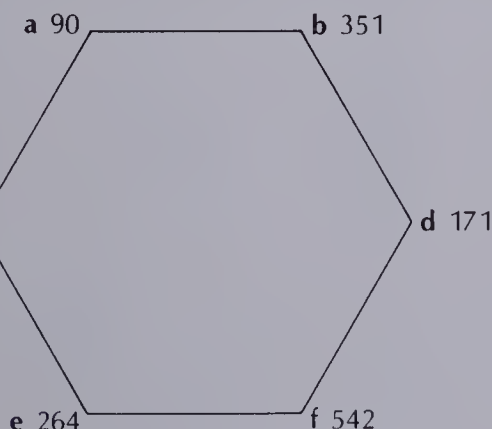
$$90 + 171 = 261$$

$$90 + 542 = 632$$

$$351 + 171 = 522$$

$$351 + 542 = 893$$

$$483 + 264 = 747$$



## Worksheet A36

Pages 164-165

$$2. 90 + 483 = 573$$

$$4. 90 + 264 = 354$$

$$6. 351 + 483 = 834$$

$$8. 351 + 264 = 615$$

$$10. 483 + 171 = 654$$

$$12. 483 + 542 = 1025$$

## Objective A37

Add 2 three-digit addends with regrouping.

## Introducing the Lesson

On page 166 the family reads in the weekend newspaper of the circus in town. Follow the steps for the addition examples noting that trading occurs from the ones and tens.

$$\begin{array}{r} 365 \\ +237 \\ \hline \end{array} \quad \text{and} \quad \begin{array}{r} 458 \\ +242 \\ \hline \end{array}$$

## Teaching the Lesson

Have someone model, using number blocks, each of the examples on page 166.

$$\begin{array}{r} 458 \\ +242 \\ \hline \end{array}$$


Trade 10 ones for 1 ten.


Trade 10 tens for 1 hundred.


Discuss the general procedure and apply it to the problems below.

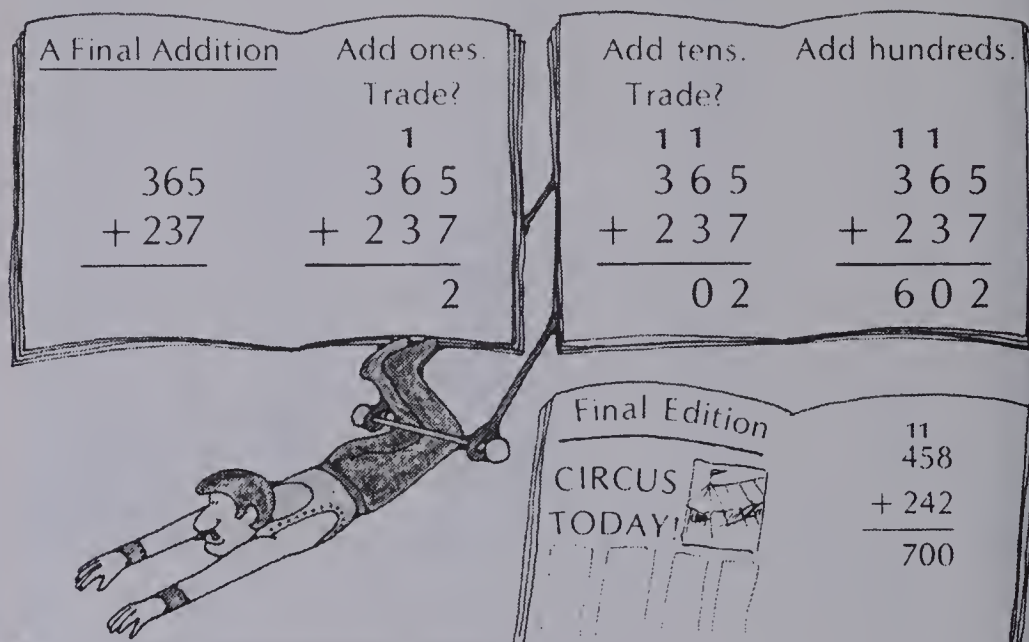
1. Add the digits in the next column.
2. Write the sum; *regrouping if necessary*.
3. Return to Step 1.

$$\begin{array}{r} 339 \\ +265 \\ \hline \end{array} \quad \begin{array}{r} 785 \\ +27 \\ \hline \end{array} \quad \begin{array}{r} 417 \\ +257 \\ \hline \end{array} \quad \begin{array}{r} 243 \\ +756 \\ \hline \end{array}$$

Again, focus on the required **decisions** regarding regrouping.

# Trading Ones and Tens

After Saturday lunch, the family reads the newspaper.



EXERCISES				
Add.				
1. $\begin{array}{r} 245 \\ +359 \\ \hline 604 \end{array}$	2. $\begin{array}{r} 816 \\ +96 \\ \hline 912 \end{array}$	3. $\begin{array}{r} 329 \\ +349 \\ \hline 678 \end{array}$	4. $\begin{array}{r} 366 \\ +523 \\ \hline 889 \end{array}$	5. $\begin{array}{r} 326 \\ +297 \\ \hline 623 \end{array}$
6. $\begin{array}{r} 639 \\ +183 \\ \hline 822 \end{array}$	7. $\begin{array}{r} 827 \\ +91 \\ \hline 918 \end{array}$	8. $\begin{array}{r} 445 \\ +527 \\ \hline 972 \end{array}$	9. $\begin{array}{r} 485 \\ +273 \\ \hline 758 \end{array}$	10. $\begin{array}{r} 707 \\ +194 \\ \hline 901 \end{array}$
11. $\begin{array}{r} 334 \\ +287 \\ \hline 621 \end{array}$	12. $\begin{array}{r} 807 \\ +105 \\ \hline 912 \end{array}$	13. $\begin{array}{r} 656 \\ +156 \\ \hline 812 \end{array}$	14. $\begin{array}{r} 392 \\ +29 \\ \hline 421 \end{array}$	15. $\begin{array}{r} 475 \\ +9 \\ \hline 484 \end{array}$

166

## Using the Exercises

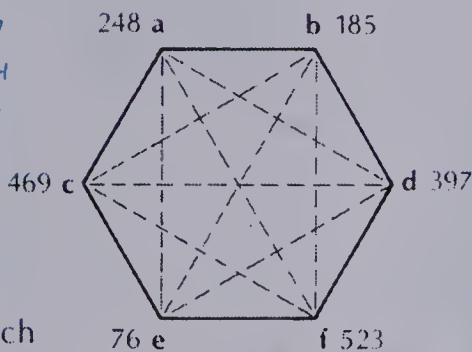
- In questions 1 to 10, trading cues are provided for the students.
- Questions 11 to 15 require the students to make trading decisions.



## PRACTICE

Add.

- |   |   |   |   |   |
|---|---|---|---|---|
| 1. $\begin{array}{r} 736 \\ + 165 \\ \hline 901 \end{array}$  | 2. $\begin{array}{r} 425 \\ + 287 \\ \hline 712 \end{array}$  | 3. $\begin{array}{r} 892 \\ + 35 \\ \hline 927 \end{array}$   | 4. $\begin{array}{r} 663 \\ + 219 \\ \hline 882 \end{array}$  | 5. $\begin{array}{r} 821 \\ + 109 \\ \hline 930 \end{array}$  |
| 6. $\begin{array}{r} 705 \\ + 199 \\ \hline 904 \end{array}$  | 7. $\begin{array}{r} 800 \\ + 156 \\ \hline 956 \end{array}$  | 8. $\begin{array}{r} 306 \\ + 287 \\ \hline 593 \end{array}$  | 9. $\begin{array}{r} 212 \\ + 739 \\ \hline 951 \end{array}$  | 10. $\begin{array}{r} 358 \\ + 578 \\ \hline 936 \end{array}$ |
| 11. $\begin{array}{r} 832 \\ + 150 \\ \hline 982 \end{array}$ | 12. $\begin{array}{r} 744 \\ + 88 \\ \hline 832 \end{array}$  | 13. $\begin{array}{r} 536 \\ + 298 \\ \hline 834 \end{array}$ | 14. $\begin{array}{r} 670 \\ + 280 \\ \hline 950 \end{array}$ | 15. $\begin{array}{r} 733 \\ + 77 \\ \hline 810 \end{array}$  |
| 16. $\begin{array}{r} 480 \\ + 282 \\ \hline 762 \end{array}$ | 17. $\begin{array}{r} 765 \\ + 185 \\ \hline 950 \end{array}$ | 18. $\begin{array}{r} 639 \\ + 288 \\ \hline 927 \end{array}$ | 19. $\begin{array}{r} 247 \\ + 353 \\ \hline 600 \end{array}$ | 20. $\begin{array}{r} 524 \\ + 198 \\ \hline 722 \end{array}$ |
| 21. $a + b$ 433   | 22. $a + c$ 717   | 23. $a + d$ 645   | 24. $a + e$ 324   | 25. $a + f$ 771   |
| 26. $b + c$ 654   | 27. $b + d$ 582   | 28. $b + e$ 261   | 29. $b + f$ 708   | 30. $c + d$ 866   |
| 31. $c + e$ 545   | 32. $c + f$ 992   | 33. $d + e$ 473   | 34. $d + f$ 920   | 35. $e + f$ 599   |
| 36. double each   |   |   |   |   |



## Circus News

Trace the teacher's  
Tangram Puzzle.

Then make these  
Circus animals.



fox



camel

167

## Practice

## Worksheet A37

Pages 166-167

- |   |  |  |  |   |
|---|--|--|--|---|
| $\begin{array}{r} 239 \\ + 328 \\ \hline 567 \end{array}$ | 2. $\begin{array}{r} 678 \\ + 178 \\ \hline 856 \end{array}$ | 3. $\begin{array}{r} 426 \\ + 487 \\ \hline 913 \end{array}$ | 4. $\begin{array}{r} 345 \\ + 72 \\ \hline 417 \end{array}$  | 5. $\begin{array}{r} 792 \\ + 49 \\ \hline 841 \end{array}$ |
| $\begin{array}{r} 461 \\ + 170 \\ \hline 631 \end{array}$ | 7. $\begin{array}{r} 786 \\ + 49 \\ \hline 835 \end{array}$  | 8. $\begin{array}{r} 420 \\ + 180 \\ \hline 600 \end{array}$ | 9. $\begin{array}{r} 356 \\ + 344 \\ \hline 700 \end{array}$ | 10. $\begin{array}{r} 178 \\ + 9 \\ \hline 187 \end{array}$ |

Kim bounced a ball 128 times.

Skip bounced a ball 152 times.

How many times in all did they bounce the ball? 280

## Assigning the Practice

Minimum: 1-34

Average: 1-36

Enriched: 1-36

## Reinforcement

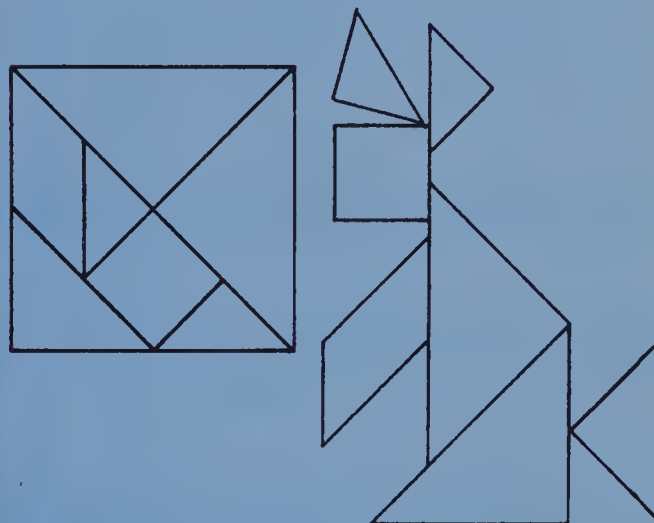
Play "Build a Clown Face."



The object of the game is to be the first player to complete a clown's face. In turn, each player draws and computes a card with a 3-digit addition question on one side. If the sum matches that shown on the back of the card, one more piece may be placed on the clown's face.

## Enrichment

1. Cut out several enlarged versions of this tangram pattern from tagboard. Show the students how to trace using templates before assigning *Circus News* on page 167.



2. Find the missing numbers.

- |   |   |   |
|---|---|---|
| a. $\begin{array}{r} \blacksquare 36 \\ + 1 \blacksquare 7 \\ \hline 92 \blacksquare \end{array}$ | b. $\begin{array}{r} \blacksquare 08 \\ + \blacksquare 3 \\ \hline 90 \blacksquare \end{array}$ | c. $\begin{array}{r} 27 \blacksquare \\ + 6 \blacksquare 4 \\ \hline \blacksquare 92 \end{array}$ |
|---|---|---|

## Objective A38

Add 3 two-digit addends with regrouping.

## Introducing the Lesson

Have the students complete the following equations orally.

- pennies = 1 dime
- pennies = 2 dimes
- dimes = 1 dollar
- dimes = 2 dollars
- ones = 1 ten
- ones = 2 tens
- tens = 1 hundred
- tens = 2 hundreds

## Teaching the Lesson

Read the problem on page 168. Use dollars, dimes, and pennies to demonstrate the addition of 3 two-digit numbers. Stress the regrouping of 20 pennies for 2 dimes.

27

10¢ 10¢

1¢ 1¢ 1¢ 1¢ 1¢ 1¢ 1¢ 1¢

48

10¢ 10¢ 10¢ 10¢

1¢ 1¢ 1¢ 1¢ 1¢ 1¢ 1¢ 1¢

+46

10¢ 10¢ 10¢ 10¢

1¢ 1¢ 1¢

10¢ 10¢

↓

Trade

20 pennies

for 2 dimes.

10¢ 10¢

10¢ 10¢ 10¢ 10¢

10¢ 10¢ 10¢ 10¢

↓

Trade

10 dimes

for 1 dollar.

10¢ 10¢

10¢ 10¢ 10¢ 10¢

10¢ 10¢ 10¢ 10¢

Have the students rewrite 172¢, 121¢, 295¢, 354¢, and 506¢ using a dollar sign.

Review the addition of three and four numbers that require trading 10 ones for 1 ten.

3

7

10

7

9

16

7

7

14

9

8

17

+9

19

+6

22

+7

21

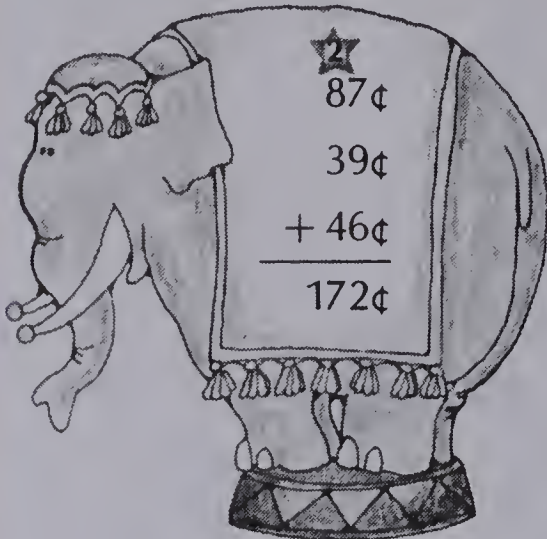
+6

23

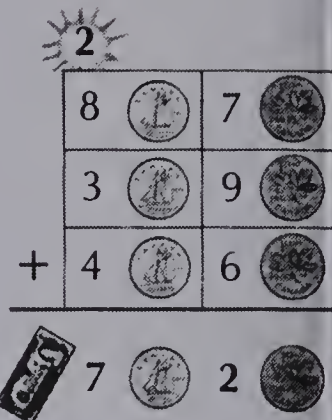
Students should use play money to illustrate the addition and regrouping of the money problem at the top of page 168 in the text.

# Three 2-digit Addends

Kim has 87¢ for the circus.  
Skip has 39¢ in one bank and 46¢ in another.  
Altogether they have \$1.72.



10 pennies = 1 dime  
10 dimes = 1 dollar



20 pennies = 2 dimes  
20 dimes = 2 dollars

## EXERCISES

Add.

1. 9 + 8 = 22

2. 6 + 2 = 11

3. 49 + 28 = 112

4. 7 + 8 = 20

5. 9 + 8 = 23

6. 77 + 88 = 230
7. 4 + 5 = 15

8. 2 + 9 = 20

9. 14 + 95 = 205

10. 8 + 4 = 15

11. 3 + 1 = 9

12. 28 + 14 = 95

168

## Using the Exercises

- Questions 1 to 12 may be viewed in sets of three. The first two problems of each set are preparation for a two-digit addition problem.



## PRACTICE

Add.

1. 76 28 +49 <u>153</u>	2. 31 54 +23 <u>108</u>	3. 83 62 +80 <u>225</u>	4. 63 27 +18 <u>108</u>	5. 69 89 +49 <u>207</u>
----------------------------------	----------------------------------	----------------------------------	----------------------------------	----------------------------------

Show the answers in two ways: using ¢ and \$.

6. 2 rabbits and a monkey  
\$2.21 221¢

7. 2 rabbits and a lion  
\$1.79 179¢

8. a monkey and 2 lions  
\$1.71 171¢



68¢  
rabbit



85¢  
monkey



43¢  
lion

## REVIEW

Add.

1. 365 +426 <u>791</u>	2. 428 +345 <u>773</u>	3. 965 +34 <u>999</u>	4. 432 +258 <u>690</u>	5. 876 +116 <u>992</u>
------------------------------	------------------------------	-----------------------------	------------------------------	------------------------------

6. 265 +384 <u>649</u>	7. 891 +25 <u>916</u>	8. 375 +184 <u>559</u>	9. 824 +83 <u>907</u>	10. 697 +261 <u>958</u>
------------------------------	-----------------------------	------------------------------	-----------------------------	-------------------------------

11. 765 +166 <u>931</u>	12. 284 +448 <u>732</u>	13. 376 +424 <u>800</u>	14. 348 +651 <u>999</u>	15. 563 +289 <u>852</u>
-------------------------------	-------------------------------	-------------------------------	-------------------------------	-------------------------------

16. 65 25 +15 <u>105</u>	17. 48 48 +48 <u>144</u>	18. 76 54 +32 <u>162</u>	19. 84 59 +78 <u>221</u>	20. 27 28 +17 <u>72</u>
-----------------------------------	-----------------------------------	-----------------------------------	-----------------------------------	----------------------------------

169

## Assigning the Practice

Minimum: 1-5

Average: 1-8

Enriched: 1-8

## Review Exercises

Questions	Objective	Pages
1-5	A35	162-163
6-10	A36	164-165
11-15	A37	166-167
16-20	A38	168-169

## Reinforcement

1. Glue sets of pennies and dimes on tagboard. Use these materials for matching activities involving pennies, dimes, and dollars.



2. Have the students practise mental addition by completing (by adding in each direction) squares of the following type.

	7	6	3	
	2	8	5	
	6	7	5	

3. Provide three elephant cards to assist with the experience of adding three numbers in different orders.



## Enrichment

Introduce and practise the following adding technique. Relate this "add now, trade later" method to that shown in the textbook.

1 7 5 9 +1 6 <u>7 22</u> 9 2	4 7 5 9 + 6 <u>9 22</u> 11 2 1 1 2	4 7 5 9 +8 6 <u>17 22</u> 19 2 1 9 2
--	---	---

## Extra Practice

Find each answer using ¢.  
Then rewrite the answer using \$.

56¢ 78¢ +21¢ <u>155¢</u> \$1.55	2. 68¢ 74¢ +21¢ <u>163¢</u> \$1.63	3. 88¢ 88¢ +88¢ <u>264¢</u> \$2.64	4. 43¢ 78¢ +29¢ <u>150¢</u> \$1.50	5. 57¢ 90¢ +81¢ <u>228¢</u> \$2.28
---	--	--	--	--

- 35¢ + 28¢ + 79¢  
142¢ \$1.42
- two fish and a snail  
126¢ \$1.26
- a turtle and two snails  
161¢ \$1.61
- a fish and two turtles  
223¢ \$2.23



89¢

turtle



45¢

fish



36¢

snail

## Worksheet A38

Pages 168-169

**Objective A39**  
Add 3 three-digit addends.

**Introducing the Lesson**  
With an addition grid and money, model the problems below. Then show how to perform the problems symbolically, referring where necessary to the materials demonstration.

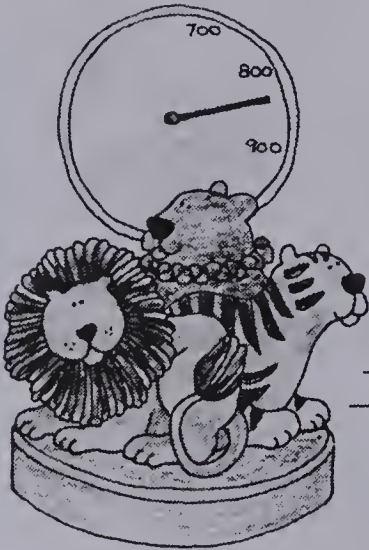
\$4.65	\$2.65
2.74	1.28
<u>1.61</u>	<u>4.98</u>

**Teaching the Lesson**  
Read and discuss the problem situation on page 170. While reviewing the addition example, make certain that the students understand that the *Trade?* step may result in a variety of decisions; for example, no trade, trade 10 tens for 1 hundred, or trade 20 tens for 2 hundreds. (Avoid the phrase “carry 1”.)

Find the mass of three students. To find their total mass, add their individual masses together. To check your answer, have the three students try to stand on a scale together, like the circus animals on page 170.

Three-Digit Addends

Three circus animals stand on the scales. They have a total mass of 837 kilograms.



Add ones.  
Trade?

$$\begin{array}{r} \boxed{1} \\ 178 \\ + 362 \\ + 297 \\ \hline 7 \end{array}$$

Add tens.  
Trade?

$$\begin{array}{r} \boxed{21} \\ 178 \\ + 362 \\ + 297 \\ \hline 37 \end{array}$$

Add hundreds.

$$\begin{array}{r} \boxed{21} \\ 178 \text{ k} \\ + 362 \text{ k} \\ + 297 \text{ k} \\ \hline 837 \text{ k} \end{array}$$

EXERCISES

Add.

1. 6 3 + 4 <u>13</u>	2. 9 4 + 9 <u>22</u>	3. 286 143 + 194 <u>623</u>	4. 7 8 + 9 <u>24</u>	5. 7 5 + 9 <u>21</u>	6. 357 158 + 199 <u>714</u>
7. 6 4 + 8 <u>18</u>	8. 6 6 + 3 <u>15</u>	9. 456 164 + 238 <u>858</u>	10. 5 3 + 9 <u>17</u>	11. 4 8 + 5 <u>17</u>	12. 235 283 + 59 <u>577</u>

Using the Exercises

- Questions 1 to 12 may be grouped in sets of three. The first two problems of each set prepare the student for a three-digit addition problem.



## PRACTICE

Add.

$$\begin{array}{r} 1. \quad 176 \\ 255 \\ + 389 \\ \hline 820 \end{array}$$

$$\begin{array}{r} 2. \quad 252 \\ 104 \\ + 631 \\ \hline 987 \end{array}$$

$$\begin{array}{r} 3. \quad 234 \\ 65 \\ + 165 \\ \hline 464 \end{array}$$

$$\begin{array}{r} 4. \quad 449 \\ 444 \\ + 48 \\ \hline 941 \end{array}$$

$$\begin{array}{r} 5. \quad 329 \\ 229 \\ + 301 \\ \hline 859 \end{array}$$

$$\begin{array}{r} 6. \quad 287 \\ 427 \\ + 198 \\ \hline 912 \end{array}$$

$$\begin{array}{r} 7. \quad 354 \\ 12 \\ + 22 \\ \hline 388 \end{array}$$

$$\begin{array}{r} 8. \quad 156 \\ 232 \\ + 356 \\ \hline 744 \end{array}$$

$$\begin{array}{r} 9. \quad 900 \\ 6 \\ + 70 \\ \hline 976 \end{array}$$

$$\begin{array}{r} 10. \quad 265 \\ 378 \\ + 78 \\ \hline 721 \end{array}$$

$$\begin{array}{r} 11. \quad 273 \\ 79 \\ + 379 \\ \hline 731 \end{array}$$

$$\begin{array}{r} 12. \quad 258 \\ 158 \\ + 358 \\ \hline 774 \end{array}$$

$$\begin{array}{r} 13. \quad 173 \\ 174 \\ + 102 \\ \hline 449 \end{array}$$

$$\begin{array}{r} 14. \quad 296 \\ 294 \\ + 297 \\ \hline 887 \end{array}$$

$$\begin{array}{r} 15. \quad 285 \\ 475 \\ + 166 \\ \hline 926 \end{array}$$

Find the total mass.

16. 475 kg

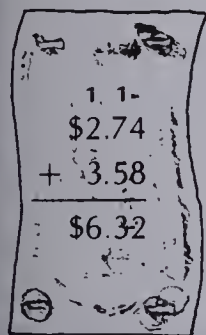
17. 575 kg

18. 120 kg

19. 225 kg

20. 320 kg

## Dollars and ... Sense?



Add.

$$\begin{array}{r} 1. \quad \$1.65 \\ + 3.78 \\ \hline \$5.43 \end{array}$$

$$\begin{array}{r} 2. \quad \$2.48 \\ + 5.34 \\ \hline \$7.82 \end{array}$$

$$\begin{array}{r} 3. \quad \$3.94 \\ + 4.87 \\ \hline \$8.81 \end{array}$$

$$\begin{array}{r} 4. \quad \$2.82 \\ + 2.84 \\ \hline \$5.66 \end{array}$$

$$\begin{array}{r} 5. \quad \$6.77 \\ + 0.77 \\ \hline \$7.54 \end{array}$$

$$\begin{array}{r} 6. \quad \$0.75 \\ + 0.25 \\ \hline \$1.00 \end{array}$$

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## Assigning the Practice

Minimum: 1-19

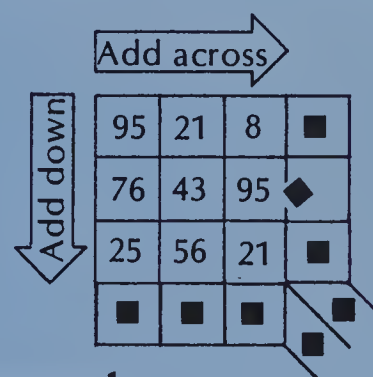
Average: 1-19

Enriched: 1-20

## Reinforcement

1. Review the addition of money amounts involving a dollar sign and cents point. Discuss the meaning of *Dollars and ... Sense?* at the bottom of page 171. Have the students use the correct word (cents) on their papers.

2. Review the addition practice format introduced in Unit 4. To avoid trading to the thousands, choose the initial nine numbers to be less than 100. Also provide blank grids.

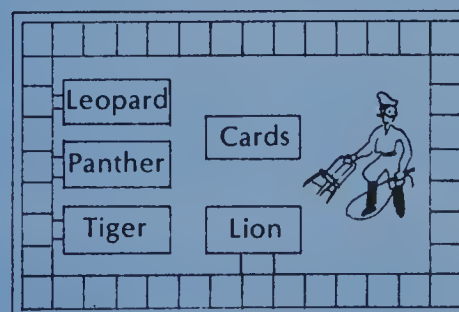


## Enrichment

1. Provide a pan balance, an intermediate mass set, and objects with a mass less than 1 kg. Require the students to add the masses of several objects and show their addition calculations.

2. Let groups of three students find their combined mass using the two methods outlined in Teaching the Lesson.

3. Provide a deck of self-checking, three-digit addition cards for the game *Circus Sorry*. The players move a lion, leopard, tiger, or panther from a start box to a final perch. If a sum is done correctly, the player moves forward by referring to the hundreds digit, e.g., for 341, move forward 3. When a sum is incorrect, the other players say, "Sorry!" and the person remains where he or she was.



## Extra Practice

## Worksheet A39

Pages 170-171

d.

$$\begin{array}{r} 365 \\ 295 \\ + 21 \\ \hline 681 \end{array}$$

$$\begin{array}{r} 2. \quad 564 \\ 198 \\ + 198 \\ \hline 960 \end{array}$$

$$\begin{array}{r} 3. \quad 638 \\ 41 \\ + 149 \\ \hline 828 \end{array}$$

$$\begin{array}{r} 4. \quad 254 \\ 76 \\ + 9 \\ \hline 339 \end{array}$$

$$\begin{array}{r} 5. \quad 283 \\ 176 \\ + 195 \\ \hline 654 \end{array}$$

$$\begin{array}{r} 196 \\ 85 \\ + 397 \\ \hline 678 \end{array}$$

$$\begin{array}{r} 7. \quad 128 \\ 496 \\ + 112 \\ \hline 736 \end{array}$$

$$\begin{array}{r} 8. \quad 354 \\ 298 \\ + 199 \\ \hline 851 \end{array}$$

$$\begin{array}{r} 9. \quad 89 \\ 256 \\ + 472 \\ \hline 817 \end{array}$$

$$\begin{array}{r} 10. \quad 503 \\ 174 \\ + 86 \\ \hline 763 \end{array}$$

$$43 + 178 + 267 = 488$$

$$12. \quad 5 + 89 + 456 = 550$$

$$346 + 9 + 82 = 437$$

$$14. \quad 11 + 9 + 721 = 741$$

## Objective N9

Round a numeral to the nearest ten or the nearest hundred.

## Introducing the Lesson

Print the numbers from 50 to 60 on the chalkboard. Show how each numeral is rounded to the nearest ten. Explain that although 55 is in the middle, it is often rounded to 60.

50 51 52 53 54 55 56 57 58 59 60

Replace the 5s in the tens places of the above two-digit numerals with 7s. Discover that the procedures of rounding do not change. Summarize the discussion.

For 1, 2, 3, 4 in the ones place:

- round down.
- replace the ones digit by zero.

For 5, 6, 7, 8, 9 in the ones place:

- round up.
- add a ten.
- replace the ones digit by zero.

Have the students round the following to the nearest ten by first printing the tens neighbours for each.

110	117	120	142
96	193		
301	58		
235	497		

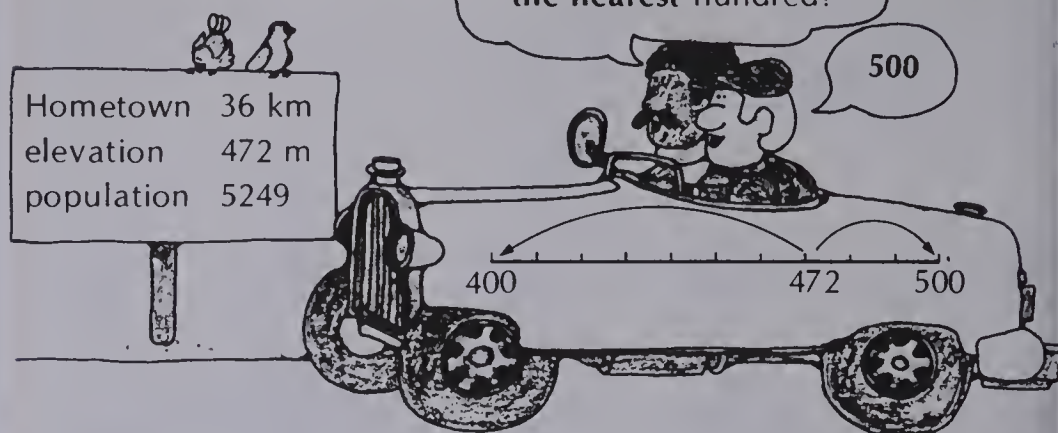
Now have the students circle the nearest ten.

## Teaching the Lesson

Have the students practise rounding these numbers to the nearest hundred by first writing the hundreds neighbours. Help them summarize the decision process.

300	335	400	500	570	600
352	509				
741	873				
98	85				

## Rounding



Round to the nearest ten.		
30	36	40
470	472	480
5240	5249	5250

Round to the nearest hundred.		
0	36	100
400	472	500
5200	5249	5300

## EXERCISES

Round to the nearest ten.

- 56: 50 or 60
- 123: 120 or 130
- 75: 70 or 80
- 767: 760 or 770
- 97: 90 or 100
- 242: 240 or 250

Round to the nearest hundred.

- 123: 100 or 200
- 757: 700 or 800
- 824: 800 or 900
- 196: 100 or 200

## Using the Exercises

- Questions 1 to 6 involve rounding numerals to the nearest ten.
- Questions 7 to 10 involve rounding numerals to the nearest hundred.



## PRACTICE

Round to the nearest ten.

1. 82 <sup>80</sup> 2. 35 <sup>40</sup> 3. 24 <sup>20</sup> 4. 8 <sup>10</sup> 5. 99 <sup>100</sup>
6. 123 <sup>120</sup> 7. 348 <sup>350</sup> 8. 275 <sup>280</sup> 9. 197 <sup>200</sup> 10. 571 <sup>570</sup>
11. 121 <sup>120</sup> 12. 305 <sup>310</sup> 13. 627 <sup>630</sup> 14. 704 <sup>700</sup> 15. 101 <sup>100</sup>

Round to the nearest hundred.

16. 620 <sup>600</sup> 17. 790 <sup>800</sup> 18. 408 <sup>400</sup> 19. 865 <sup>900</sup> 20. 125 <sup>100</sup>
21. 259 <sup>300</sup> 22. 849 <sup>800</sup> 23. 751 <sup>800</sup> 24. 325 <sup>300</sup> 25. 25 <sup>0</sup>
26. 3465 <sup>3500</sup> 27. 7205 <sup>7200</sup> 28. 3649 <sup>3600</sup> 29. 1970 <sup>2000</sup> 30. 975 <sup>1000</sup>

## Trading Hundreds

10 hundreds = 1 thousand      20 hundreds = 2 thousands

1.  $\begin{array}{r} 900 \\ + 500 \\ \hline 1400 \end{array}$  2.  $\begin{array}{r} 600 \\ + 600 \\ \hline 1200 \end{array}$  3.  $\begin{array}{r} 875 \\ + 424 \\ \hline 1299 \end{array}$  4.  $\begin{array}{r} 546 \\ + 886 \\ \hline 1432 \end{array}$  5.  $\begin{array}{r} 938 \\ + 698 \\ \hline 1636 \end{array}$
6.  $\begin{array}{r} 783 \\ + 432 \\ \hline 1215 \end{array}$  7.  $\begin{array}{r} 265 \\ + 735 \\ \hline 1000 \end{array}$  8.  $\begin{array}{r} 394 \\ + 806 \\ \hline 1200 \end{array}$  9.  $\begin{array}{r} 749 \\ + 888 \\ \hline 1637 \end{array}$  10.  $\begin{array}{r} 765 \\ + 436 \\ \hline 1201 \end{array}$
11.  $\begin{array}{r} 782 \\ 354 \\ + 268 \\ \hline 1404 \end{array}$  12.  $\begin{array}{r} 985 \\ 409 \\ + 369 \\ \hline 1763 \end{array}$  13.  $\begin{array}{r} 638 \\ 806 \\ + 842 \\ \hline 2286 \end{array}$  14.  $\begin{array}{r} 868 \\ 643 \\ + 825 \\ \hline 2336 \end{array}$  15.  $\begin{array}{r} 842 \\ 637 \\ + 308 \\ \hline 1787 \end{array}$
16.  $\begin{array}{r} 658243 \\ + 438927 \\ \hline 1097170 \end{array}$  17.  $\begin{array}{r} 43265802 \\ + 38793099 \\ \hline 82058901 \end{array}$

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## Assigning the Practice

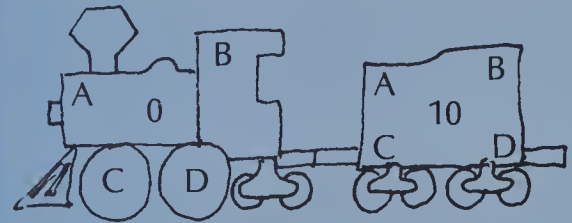
Minimum: 1-25

Average: 1-25

Enriched: 1-30

## Reinforcement

1. Play the "Circus Train" game. Provide playing cards, numbered from 0 to 100 and Circus Train game boards (10 cars numbered 0, 10, 20, ..., 100), for rounding to the nearest ten.



After the cards are shuffled and dealt out, each player (A, B, C, and D) in turn puts a card on the designated spot of the appropriate railway car.

Mistaken attempts are placed above the smoke stack. At the end of the game, the student with the most cards on a particular railway car claims a point. In case of ties, several students may win a point for that car. The player with the most points from all 10 cars becomes the next dealer.

2. Use the back of the Circus Train game boards for a similar activity for rounding to the nearest hundred.

## Enrichment

1. Assign *Trading Hundreds* at the bottom of page 173.

2. For several small, nearby communities prepare distance, elevation, and population signs similar to the one for "Hometown" on page 172. Use these signs to discuss rounding.

## Extra Practice

## Worksheet N9

Pages 172-173

Complete.

Numeral	Nearest ten	Nearest hundred
72	70	100
247	250	200
96	100	100
185	190	200
303	300	300
534	530	500
629	630	600
375	380	400

**Objective A40**

Estimate sums of two-digit and three-digit addends.

**Introducing the Lesson**

Upon returning home from the circus, Skip and Kim invent a circus game while reading animal picture books. In both activities, they *estimate sums*.

Estimating a sum requires a thoughtful guess. Discuss how estimating sums may be used:

1. before calculating, to find an approximate sum, perhaps when pencil and paper are not available.
2. after calculating, to check the reasonableness of the calculation.

Discuss appropriate instances of the following uses for estimating sums:

1. finding the approximate cost of groceries to determine if one has enough money for a purchase.
2. checking a sum that seems too large or too small.

**Teaching the Lesson**

Sums may be estimated by rounding the addends and then adding. Discuss these examples.

$$\begin{array}{r} 385 \\ +423 \\ \hline \end{array} \rightarrow \begin{array}{r} 400 \\ +400 \\ \hline 800 \end{array} \qquad \begin{array}{r} 92 \\ +78 \\ \hline \end{array} \rightarrow \begin{array}{r} 90 \\ +80 \\ \hline 170 \end{array}$$

$$\begin{array}{r} 425 \\ +86 \\ \hline \end{array} \rightarrow \begin{array}{r} 400 \\ +100 \\ \hline 500 \end{array} \quad \text{or} \quad \begin{array}{r} 400 \\ +90 \\ \hline 490 \end{array}$$

Ask the students to compute the exact sums of the examples and compare their answers with their estimates.

**Estimating Sums**

To estimate sums: Round the addends.

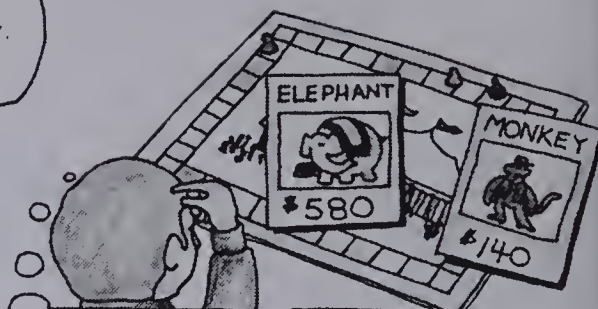
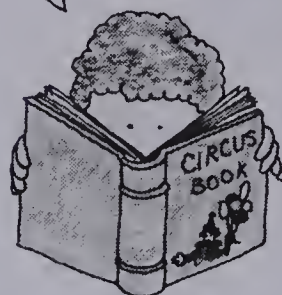
Then add.

$$285 + 423$$

$$300 + 400$$

$$300 + 400 = 700$$

I read 212 pages today and 373 pages yesterday. That's about 600 in all.



Can I buy these? I have only \$800. I can because they cost about \$700.

**EXERCISES**

Write an estimate of the sum.

$$\begin{array}{l} 1. \quad 480 \quad 500 \\ \quad + 210 \quad 200 \\ \quad \hline \quad 700 \end{array} \quad \begin{array}{l} 2. \quad 186 \quad 200 \\ \quad + 592 \quad 600 \\ \quad \hline \quad 800 \end{array} \quad \begin{array}{l} 3. \quad 380 \quad 400 \\ \quad + 317 \quad 300 \\ \quad \hline \quad 700 \end{array} \quad \begin{array}{l} 4. \quad 62 \quad 60 \\ \quad + 72 \quad 70 \\ \quad \hline \quad 130 \end{array} \quad \begin{array}{l} 5. \quad 57 \quad 60 \\ \quad + 92 \quad 90 \\ \quad \hline \quad 150 \end{array}$$

Write an estimate first. Then check by adding.

$$\begin{array}{l} 6. \quad 356 \quad 400 \\ \quad + 421 \quad 400 \\ \quad \hline \quad 777 \end{array} \quad \begin{array}{l} 7. \quad 635 \quad 600 \\ \quad + 275 \quad 300 \\ \quad \hline \quad 910 \end{array} \quad \begin{array}{l} 8. \quad 106 \quad 100 \\ \quad + 793 \quad 800 \\ \quad \hline \quad 899 \end{array} \quad \begin{array}{l} 9. \quad 682 \quad 700 \\ \quad + 193 \quad 200 \\ \quad \hline \quad 875 \end{array} \quad \begin{array}{l} 10. \quad 251 \quad 300 \\ \quad + 249 \quad 200 \\ \quad \hline \quad 500 \end{array}$$

$$\begin{array}{l} 11. \quad 76 \quad 80 \\ \quad + 13 \quad 10 \\ \quad \hline \quad 89 \end{array} \quad \begin{array}{l} 12. \quad 93 \quad 90 \\ \quad + 28 \quad 30 \\ \quad \hline \quad 121 \end{array} \quad \begin{array}{l} 13. \quad 83 \quad 80 \\ \quad + 87 \quad 90 \\ \quad \hline \quad 170 \end{array} \quad \begin{array}{l} 14. \quad 46 \quad 50 \\ \quad + 29 \quad 30 \\ \quad \hline \quad 75 \end{array} \quad \begin{array}{l} 15. \quad 98 \quad 100 \\ \quad + 96 \quad 100 \\ \quad \hline \quad 194 \end{array}$$

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**Using the Exercises**

- Questions 1 to 5 require the students to round each addend to the nearest hundred and then add to find the estimated sum.
- In questions 6 to 15 the students must find both the estimated sum and the exact sum.



## PRACTICE

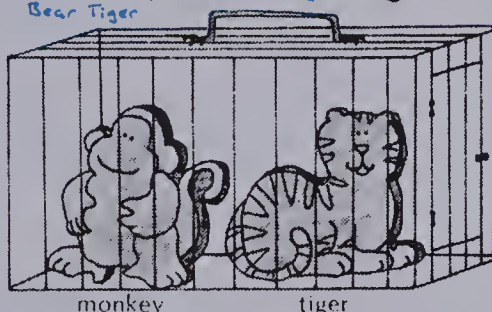
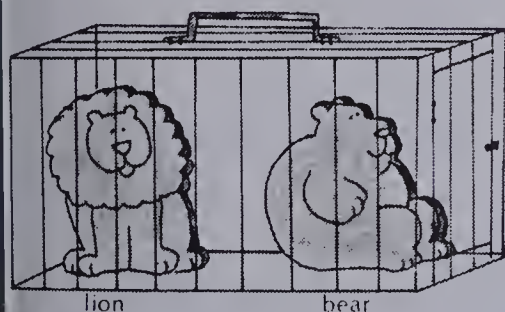
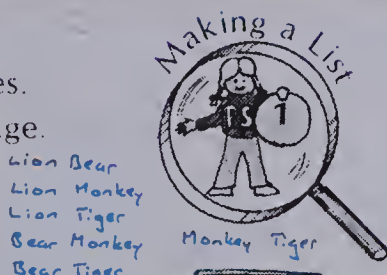
Estimate each sum.

- Kim's reading book has 175 pages.  
Her math book has 240 pages.  
About how many pages are there in all?  $\begin{matrix} 400 \\ 415 \end{matrix}$
- Skip has a dog card worth \$185.  
He has a tiger card worth \$620.  
About how much are these cards worth?  $\begin{matrix} \$800 \\ \$805 \end{matrix}$
- $\begin{matrix} 563 & 600 \\ +222 & 200 \\ \hline 785 \end{matrix}$
- $\begin{matrix} 289 & 300 \\ +572 & 600 \\ \hline 861 \end{matrix}$
- $\begin{matrix} 435 & 400 \\ +386 & 400 \\ \hline 821 \end{matrix}$
- $\begin{matrix} 668 & 700 \\ +209 & 200 \\ \hline 877 \end{matrix}$
- $\begin{matrix} 137 & 100 \\ +251 & 300 \\ \hline 388 \end{matrix}$
- $\begin{matrix} 64 & 60 \\ +89 & 90 \\ \hline 153 \end{matrix}$
- $\begin{matrix} 35 & 40 \\ +68 & 70 \\ \hline 103 \end{matrix}$
- $\begin{matrix} 70 & 70 \\ +93 & 90 \\ \hline 163 \end{matrix}$
- $\begin{matrix} 418 & 400 \\ +75 & 100 \\ \hline 493 \end{matrix}$
- $\begin{matrix} 358 & 400 \\ +96 & 100 \\ \hline 454 \end{matrix}$
- Check questions 1 to 12 by adding.

## Animal Crackers

Kim has 4 animal crackers and 2 cages.  
She puts a pair of crackers in each cage.  
In how many ways can she do this?

Hint! Make a list of all the pairs.



6 different pairs.

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## Assigning the Practice

Minimum: 1-13

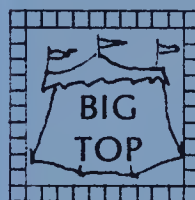
Average: 1-13

Enriched: 1-13

## Reinforcement

1. Have the students practise mental estimation of sums. Allow the students having difficulty to find the sum on paper after rounding the numbers mentally, or vice versa.

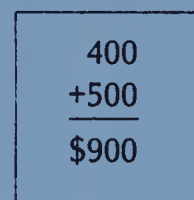
2. Play the "Big Top" estimation game. Place circus animal cards along the edge (path) of a game board. In turn, the players roll a die and move a marker forward the number of spaces indicated. If an animal card is landed on, the player must estimate the sum. If the estimate matches the answer on the back of the card, the student gives the card to the bank in return for play money. The winner is the student with the most money when all the animal cards have been sold back to the bank.



Game board



Animal card (front)



Animal card (back)

## Enrichment

1. Help the students with *Animal Crackers* at the bottom of page 175 by showing them how to organize a list. Encourage divergent interpretations of the problem.

2. Have the students analyze the estimation process more carefully.

- If one addend is rounded up and the other down, the result is fairly accurate.
- If both addends are rounded up, the estimate is larger than the sum.
- If both addends are rounded down, the estimate is smaller than the sum.

3. Assign this puzzler.

Leon the lion tamer has to build 6 cages for his lions. How can he do this with only 12 walls of equal size?

Answer:



## Extra Practice

Estimate the sum. Complete the message below.

- |   |   |  |  |  |
|---|---|--|--|--|
| $\begin{matrix} 37 & 40 \\ +62 & 60 \\ \hline 100 \end{matrix}$     | $\begin{matrix} 22 & 20 \\ +31 & 30 \\ \hline 50 \end{matrix}$      | $\begin{matrix} 17 & 20 \\ +38 & 40 \\ \hline 60 \end{matrix}$   | $\begin{matrix} 64 & 60 \\ +98 & 100 \\ \hline 160 \end{matrix}$ | $\begin{matrix} 96 & 100 \\ +43 & 40 \\ \hline 140 \end{matrix}$   |
| $\begin{matrix} 172 & 200 \\ +409 & 400 \\ \hline 600 \end{matrix}$ | $\begin{matrix} 278 & 300 \\ +164 & 200 \\ \hline 500 \end{matrix}$ | $\begin{matrix} 312 & 300 \\ +24 & 0 \\ \hline 300 \end{matrix}$ | $\begin{matrix} 686 & 700 \\ +19 & 0 \\ \hline 700 \end{matrix}$ | $\begin{matrix} 315 & 300 \\ +97 & 100 \\ \hline 400 \end{matrix}$ |

E	S	T	I	M	A	T	E
700	50	160	500	100	60	160	700
Y	O	U	R	S	U	M	S
300	600	400	140	50	400	100	50

## Worksheet A40

Pages 174-175



## Objective PS15

Count on using coins.

### Introducing the Lesson

Introduce the nickel and quarter. Establish that a nickel equals 5 cents, 2 nickels equal a dime, 5 nickels equal a quarter, and 4 quarters equal one dollar.

Practise counting as shown on page 176, using coins (pennies, nickels, dimes, quarters) and one-dollar bills. First, record the counting columns. Investigate the number patterns. Then, practise counting mentally without materials or recording aids.

### Teaching the Lesson

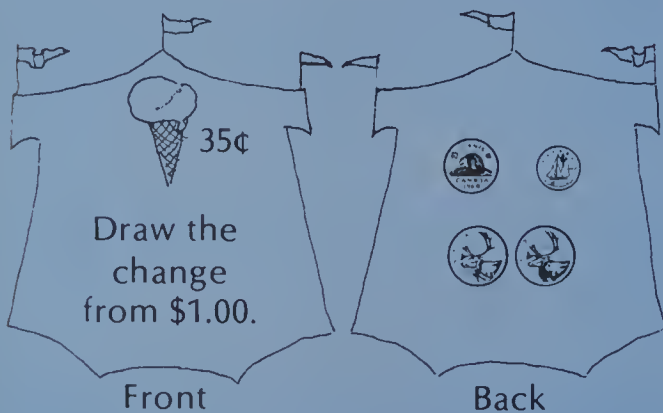
At the bottom of page 176, the student is to count on with the *change* from the cost of the item to the *money paid* for it. Use sales tags and coins to discuss and practise the counting situations. Record the intermediate amounts.

Cost of item      Change

\$1.63	
\$0.35	
\$3.80	
\$2.69	

### Reinforcement

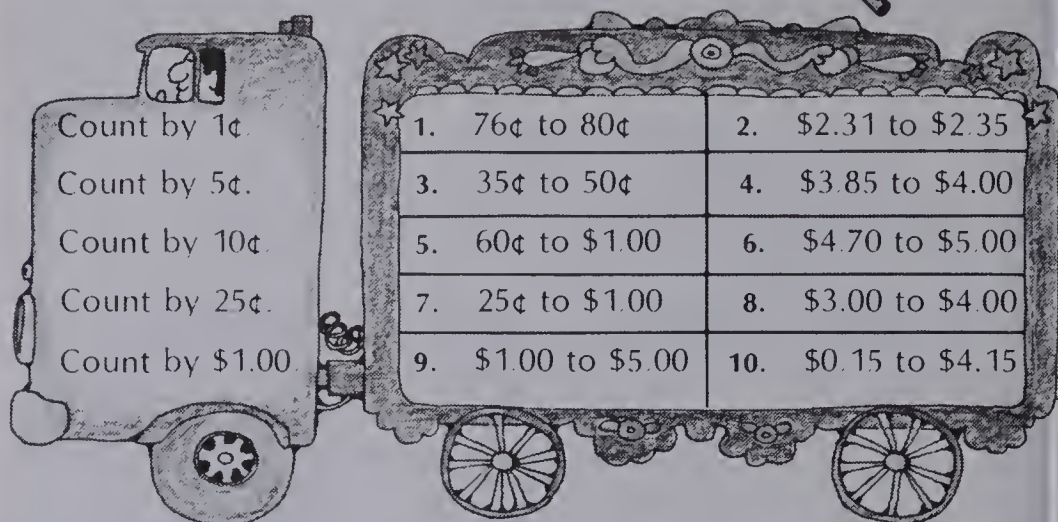
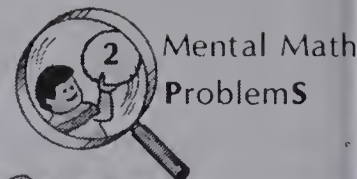
Construct self-checking work cards involving the kinds of problems found on pages 176-177. Use a variety of circus shapes for the work card format: trucks, tents, animals, etc.



Include the answers on the back of each work card.

## Making Change

First, try these in your head.  
Then, write the answers.



Cost plus change equals money paid.

\$1.64	→	\$1.65	→	\$1.75	→	\$2.00
--------	---	--------	---	--------	---	--------

11.  \$3.70	\$5.00	12.  \$2.65	\$3
13.  \$0.49	\$1	14.  \$4.89	\$5
15.  \$1.34	\$2		
16.  70¢	\$2		

176

### Problem Solving Activities

Assign Level 3, Unit 9.



# Problem Solving

Make change.

Use the number of coins and bills shown.



Cost	Change	Money Paid
\$3.94		\$5.00 \$1.06
1. \$0.73		\$1.00 \$0.27
2. \$1.34		\$1.50 \$0.16
3. \$1.59		\$2.00 \$0.41
4. \$2.74		\$5.00 \$2.26
5. \$3.30		\$4.00 \$0.70
6. \$3.13		\$3.50 \$0.37

## REVIEW

Add.

A39

1. 736 129 + 123 988	2. 486 286 + 299 1071	3. 271 179 + 379 829	4. 356 246 + 248 850
-------------------------------	--------------------------------	-------------------------------	-------------------------------

Round each to the nearest ten **and** nearest hundred.

N9

5. 346 <sup>350</sup> <sub>300</sub>	6. 655 <sup>660</sup> <sub>700</sub>	7. 74 <sup>70</sup> <sub>100</sub>	8. 309 <sup>310</sup> <sub>300</sub>
--------------------------------------	--------------------------------------	------------------------------------	--------------------------------------

Estimate the sum.

A40

9. 358 <sup>400</sup> + 421 <sup>400</sup> 800	10. 409 <sup>400</sup> + 508 <sup>500</sup> 900	11. 78 <sup>80</sup> + 42 <sup>40</sup> 120	12. 33 <sup>30</sup> + 86 <sup>90</sup> 120
--	---	---	---

779

917

120

119

177

## Objective PS16

Make change to \$5.00.

## Introducing the Lesson

The **guess and test** strategy of problem solving requires the student to estimate a solution and then test it. Students need reassurance that the first guesses may not be correct. Model the following problem as outlined.

A hat cost \$2.44. Bill paid \$3.00.

What four coins did he get in return?

\$2.44 — 1¢ 10¢ 10¢ 10¢ — \$2.75 NO

\$2.44 — 1¢ 5¢ 10¢ 25¢ — \$2.85 NO

\$2.44 — 1¢ 5¢ 10¢ 10¢ — \$2.70 NO

\$2.44 — 1¢ 5¢ 25¢ 25¢ — \$3.00 YES

## Teaching the Lesson

Through investigation and discussion, establish experience with making change. Lead the students to the discovery of these helpful hints.

1. Usually begin with small coins.

2. First, add pennies to get amounts ending in 0 or 5.

3. Second, if the amount ends in 5 (but not 25 or 75), add a nickel to make an amount ending in 0.

4. Third, if the amount ends in 0 (but not 50 or 00), add dimes until the amount ends in 50 or 00.

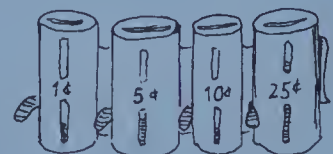
## Review Exercises

Questions	Objective	Pages
1-4	A39	170-171
5-8	N9	172-173
9-12	A40	174-175

## Enrichment

1. If you have not done so as yet, establish a classroom store. Provide the store with play money, a toy cash register, second-hand toys, and simple school supplies. Ensure making change is an inherent part of the store's operation by setting prices appropriately.

2. Invite an older student who uses a coin dispenser to demonstrate it for the class.



## Extra Practice

## Worksheet PS15-PS16

Pages 176-177

Make change. Use the fewest coins possible.

Cost	1¢	5¢	10¢	25¢	Money Paid
21¢	4			3	\$1.00
63¢	2		1	1	\$1.00
35¢		1	1	2	\$1.00
84¢	1	1	1		\$1.00
98¢	2				\$1.00
75¢				1	\$1.00
12¢	3		1	3	\$1.00
54¢	1		2	1	\$1.00

Unit 9 Objectives	Test Questions	Pages
A35	1-4	162-163
A36	5-8	164-165
A37	9-12	166-167
A38	13-16	168-169
A39	17-20	170-171
N9	21-24	172-173
A40	25-28	174-175

# TEST

# UNIT 9

Add.

$$\begin{array}{r} 1. \quad 357 \\ + 542 \\ \hline 899 \end{array}$$

$$\begin{array}{r} 2. \quad 268 \\ + 614 \\ \hline 882 \end{array}$$

$$\begin{array}{r} 3. \quad 824 \\ + 159 \\ \hline 983 \end{array}$$

$$\begin{array}{r} 4. \quad 374 \\ + 216 \\ \hline 590 \end{array}$$

$$\begin{array}{r} 5. \quad 724 \\ + 184 \\ \hline 908 \end{array}$$

$$\begin{array}{r} 6. \quad 356 \\ + 473 \\ \hline 829 \end{array}$$

$$\begin{array}{r} 7. \quad 184 \\ + 815 \\ \hline 999 \end{array}$$

$$\begin{array}{r} 8. \quad 255 \\ + 590 \\ \hline 845 \end{array}$$

$$\begin{array}{r} 9. \quad 635 \\ + 186 \\ \hline 821 \end{array}$$

$$\begin{array}{r} 10. \quad 749 \\ + 195 \\ \hline 944 \end{array}$$

$$\begin{array}{r} 11. \quad 676 \\ + 276 \\ \hline 952 \end{array}$$

$$\begin{array}{r} 12. \quad 543 \\ + 257 \\ \hline 800 \end{array}$$

$$\begin{array}{r} 13. \quad 26 \\ \quad 32 \\ + 32 \\ \hline 90 \end{array}$$

$$\begin{array}{r} 14. \quad 37 \\ \quad 48 \\ + 86 \\ \hline 171 \end{array}$$

$$\begin{array}{r} 15. \quad 43 \\ \quad 76 \\ + 99 \\ \hline 218 \end{array}$$

$$\begin{array}{r} 16. \quad 98 \\ \quad 88 \\ + 48 \\ \hline 234 \end{array}$$

$$\begin{array}{r} 17. \quad 356 \\ \quad 235 \\ + 244 \\ \hline 835 \end{array}$$

$$\begin{array}{r} 18. \quad 478 \\ \quad 187 \\ + 288 \\ \hline 953 \end{array}$$

$$\begin{array}{r} 19. \quad 263 \\ \quad 258 \\ + 194 \\ \hline 715 \end{array}$$

$$\begin{array}{r} 20. \quad 149 \\ \quad 368 \\ + 326 \\ \hline 843 \end{array}$$

Round to the nearest ten and to the nearest hundred.

$$21. \quad 64 \overset{60}{\underset{100}{}}$$

$$22. \quad 235 \overset{240}{\underset{200}{}}$$

$$23. \quad 752 \overset{750}{\underset{800}{}}$$

$$24. \quad 540 \overset{540}{\underset{500}{}}$$

Estimate the sum.

$$\begin{array}{r} 25. \quad 475 \overset{500}{\underset{300}{}} \\ + 335 \overset{300}{\underset{300}{}} \\ \hline 800 \end{array}$$

$$\begin{array}{r} 26. \quad 612 \overset{600}{\underset{300}{}} \\ + 322 \overset{300}{\underset{300}{}} \\ \hline 900 \end{array}$$

$$\begin{array}{r} 27. \quad 480 \overset{500}{\underset{400}{}} \\ + 395 \overset{400}{\underset{400}{}} \\ \hline 900 \end{array}$$

$$\begin{array}{r} 28. \quad 229 \overset{200}{\underset{200}{}} \\ + 496 \overset{500}{\underset{500}{}} \\ \hline 700 \end{array}$$

178 **810**

934

875

725

## Post-test

Uni

Add.

$$\begin{array}{r} 1. \quad 356 \\ + 143 \\ \hline 499 \end{array}$$

$$\begin{array}{r} 2. \quad 243 \\ + 30 \\ \hline 273 \end{array}$$

$$\begin{array}{r} 3. \quad 307 \\ + 504 \\ \hline 811 \end{array}$$

$$\begin{array}{r} 4. \quad 1 \\ + 7 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 5. \quad 365 \\ + 364 \\ \hline 729 \end{array}$$

$$\begin{array}{r} 6. \quad 278 \\ + 481 \\ \hline 759 \end{array}$$

$$\begin{array}{r} 7. \quad 784 \\ + 75 \\ \hline 859 \end{array}$$

$$\begin{array}{r} 8. \quad 1 \\ + 3 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 9. \quad 624 \\ + 198 \\ \hline 822 \end{array}$$

$$\begin{array}{r} 10. \quad 583 \\ + 37 \\ \hline 620 \end{array}$$

$$\begin{array}{r} 11. \quad 276 \\ + 157 \\ \hline 433 \end{array}$$

$$\begin{array}{r} 12. \quad 1 \\ + 9 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 13. \quad 21 \\ \quad 32 \\ + 46 \\ \hline 99 \end{array}$$

$$\begin{array}{r} 14. \quad 36 \\ \quad 46 \\ + 54 \\ \hline 136 \end{array}$$

$$\begin{array}{r} 15. \quad 28 \\ \quad 38 \\ + 57 \\ \hline 123 \end{array}$$

$$\begin{array}{r} 16. \quad 1 \\ + 20 \\ \hline 20 \end{array}$$



## DIVISION





How many groups of:

1. 3 in 12? <sup>4</sup>      2. 2 in 18? <sup>9</sup>      3. 4 in 8? <sup>2</sup>      4. 5 in 15? <sup>3</sup>

Copy and complete.

5.  $7 \times 3 = \blacksquare$  <sup>21</sup>  
 $21 \div 3 = \blacksquare$  <sup>7</sup>
6.  $5 \times 4 = \blacksquare$  <sup>20</sup>  
 $20 \div 4 = \blacksquare$  <sup>5</sup>
7.  $\blacksquare \times 3 = 15$  <sup>5</sup>  
 $15 \div 3 = \blacksquare$  <sup>5</sup>
8.  $\blacksquare \times 4 = 16$  <sup>4</sup>  
 $16 \div 4 = \blacksquare$  <sup>4</sup>

Divide.

9.  $14 \div 2$  <sup>7</sup>    10.  $14 \div 2$  <sup>7</sup>    11.  $18 \div 2$  <sup>9</sup>    12.  $18 \div 3$  <sup>6</sup>
13.  $4 \div 2$  <sup>2</sup>    14.  $16 \div 4$  <sup>4</sup>    15.  $12 \div 4$  <sup>3</sup>    16.  $2 \div 2$  <sup>1</sup>
17.  $20 \div 5$  <sup>4</sup>    18.  $20 \div 4$  <sup>5</sup>    19.  $25 \div 5$  <sup>5</sup>    20.  $5 \div 5$  <sup>1</sup>
21.  $40 \div 5$  <sup>8</sup>    22.  $30 \div 5$  <sup>6</sup>    23.  $15 \div 5$  <sup>3</sup>    24.  $45 \div 5$  <sup>9</sup>
25.  $21 \div 3$  <sup>7</sup>    26.  $12 \div 4$  <sup>3</sup>    27.  $9 \div 3$  <sup>3</sup>    28.  $3 \div 3$  <sup>1</sup>
29.  $27 \div 3$  <sup>9</sup>    30.  $18 \div 3$  <sup>6</sup>    31.  $24 \div 8$  <sup>3</sup>    32.  $12 \div 3$  <sup>4</sup>
33.  $32 \div 4$  <sup>8</sup>    34.  $32 \div 4$  <sup>8</sup>    35.  $20 \div 5$  <sup>4</sup>    36.  $4 \div 4$  <sup>1</sup>
37.  $36 \div 4$  <sup>9</sup>    38.  $24 \div 4$  <sup>6</sup>    39.  $20 \div 4$  <sup>5</sup>    40.  $8 \div 2$  <sup>4</sup>
41.  $0 \div 2$  <sup>0</sup>    42.  $0 \div 4$  <sup>0</sup>    43.  $0 \div 9$  <sup>0</sup>    44.  $0 \div 7$  <sup>0</sup>
45.  $9 \div 1$  <sup>9</sup>    46.  $3 \div 1$  <sup>3</sup>    47.  $1 \div 1$  <sup>1</sup>    48.  $0 \div 1$  <sup>0</sup>
49. 27  in all  
 3  for each tricycle  
 How many tricycles? <sup>9</sup>
50. 36  in all  
 4  on each bicycle  
 How many bicycles? <sup>9</sup>

179

## Informal Assessment

1. Have the student perform these problems using place-value materials.

$$\begin{array}{r} 326 \\ +406 \\ \hline \end{array} \quad \begin{array}{r} 382 \\ + 42 \\ \hline \end{array} \quad \begin{array}{r} 643 \\ +178 \\ \hline \end{array} \quad \begin{array}{r} 25 \\ 67 \\ +48 \\ \hline \end{array} \quad \begin{array}{r} 365 \\ 272 \\ + 90 \\ \hline \end{array}$$

2. Have the student discuss these problems while completing them without place-value materials.

$$\begin{array}{r} 438 \\ + 14 \\ \hline \end{array} \quad \begin{array}{r} 590 \\ +190 \\ \hline \end{array} \quad \begin{array}{r} 785 \\ +125 \\ \hline \end{array} \quad \begin{array}{r} 33 \\ 3 \\ +16 \\ \hline \end{array} \quad \begin{array}{r} 384 \\ 286 \\ + 87 \\ \hline \end{array}$$

3. Have the student show on a number line how to round these numbers to the nearest ten:

38      64      92      6      75

and these numbers to the nearest hundred:

238      264      292      206      285

4. Have the student discuss these problems while estimating the sum.

$$206 + 292 =$$

$$285 + 285 =$$

5. Have the student practise counting on using coins. Then have the student make change for these situations.

Cost: \$0.36,      Paid: \$1.00

Cost: \$0.85,      Paid: \$2.00

$$\begin{array}{r} 356 \\ 121 \\ +212 \\ \hline 689 \end{array} \quad \begin{array}{r} 18. \quad 264 \\ \quad 387 \\ +112 \\ \hline 763 \end{array} \quad \begin{array}{r} 19. \quad 285 \\ \quad 275 \\ +365 \\ \hline 925 \end{array} \quad \begin{array}{r} 20. \quad 176 \\ \quad 376 \\ +476 \\ \hline 1028 \end{array}$$

und to the nearest hundred.

92 <sup>100</sup>      22. 36 <sup>0</sup>      23. 428 <sup>400</sup>      24. 350 <sup>400</sup>

imate the sum.

$$\begin{array}{r} 307 \quad 300 \\ +225 \quad 200 \\ \hline 500 \\ 532 \end{array} \quad \begin{array}{r} 26. \quad 575 \quad 600 \\ \quad +185 \quad 200 \\ \hline 760 \end{array} \quad \begin{array}{r} 27. \quad 354 \quad 400 \\ \quad +440 \quad 400 \\ \hline 794 \end{array} \quad \begin{array}{r} 28. \quad 700 \quad 732 \\ \quad 100 \quad + 96 \\ \hline 800 \\ 828 \end{array}$$

# UNIT 10

## Subtraction II

Theme: Canadian Communities

Lesson		Objective	Vocabulary	Materials
Preview		Review 2-digit subtraction.	difference	place-value blocks
1	A41	Subtract 3-digit numerals with regrouping from the tens place.	trade a ten	place-value blocks, subtraction grid
2	A42	Subtract 3-digit numerals with regrouping from the hundreds place.	trade a hundred	place-value blocks, subtraction grid
3	A43	Subtract 3-digit numerals with regrouping.	trading decision	place-value blocks, subtraction grid
4	G2	Identify equal and unequal portions.	equal, unequal, portion	apple, orange, and other objects which can be divided, map of Canada
5	A44	Subtract 3-digit numerals with zero tens in the minuend.	zero, difference	place-value blocks
6	M14	Subtract money amounts to \$9.99.	dollars, cents, difference	dollars, dimes, pennies, subtraction grid
7	PS17	Solve two-step word problems involving addition and subtraction.	sum, difference, row, column	
	PS18	Follow a flow chart.	flow chart, greater than $>$ , less than $<$ , compare	poster board for flow chart
8	G3	Identify and investigate symmetric figures.	symmetric, equal, lines of symmetry	construction paper
Test		Subtraction		
Review		Addition		

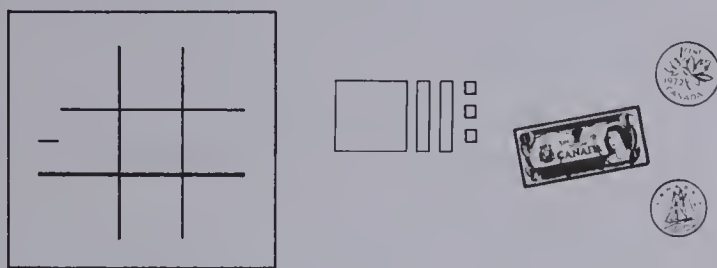


# About This Unit

Specific instances of the subtraction algorithm for three-digit numerals were introduced in Unit 5. Unit 10, Subtraction II, prepares students for success with three-digit subtraction problems of all types. It contains a careful development of the subtraction algorithm and focuses on these essential skills:

- decisions and processes involving trading (regrouping),
- subtraction of basic facts,
- alignment of place-value positions for subtraction,
- finding differences between numbers, and
- trading with zero tens in the minuend.

As with other computation units, the use of manipulative materials is helpful for establishing meaningful procedures and for facilitating recall. Recommended materials include number blocks, money, and subtraction grids. By this stage, the practice and mastery of subtraction without reference to materials should be quite common.



The teacher must, of course, remain sensitive to individual needs: to challenge students to model with concrete materials, to manipulate abstract symbols, to recognize patterns, and to investigate problem-solving situations.

Lesson 5 is devoted to subtraction problems involving zero tens in the minuend. The method utilized has proven successful for students who have undergone thorough training in place value as provided in previous units and lessons.

$$\begin{array}{r}
 69 \quad 16 \\
 \cancel{7} \cancel{0} \quad \cancel{8} \\
 -1 \quad 2 \quad 8 \\
 \hline
 5 \quad 7 \quad 8
 \end{array}$$

Stress that 7 hundreds = 70 tens.

Typically, three-digit subtractions are one of the more difficult and formal topics of a Grade 3 mathematics program. Special care has been

taken in designing Unit 10 to incorporate several vital ingredients:

- an appropriate sequencing and pacing of topics,
- a balance of concrete and symbolic presentations,
- a simple but interesting integrative theme, and
- a sufficient but not burdensome amount of practice.

In addition, two lessons of a more intuitive nature have been included to provide a mathematical interlude and an opportunity for you to diagnose and remediate problems with subtraction. Lesson 4 is devoted to the concepts of equal and unequal. As such, it's a developmental lesson for the topics of symmetry, fractions, and area which appear later in the text. Lesson 8 contains a treatment of symmetry which dovetails with the integrative topic of Canadian flags and symbols and the subject matter of the next unit—Geometry.

## Ideas

The theme of Unit 10, Subtraction II, is *Canadian Communities*. Many of the lessons maintain a focus upon a province or region through illustrations and appropriate extra activities. The thematic content has been designed and organized both to support incidental learning opportunities and to provide review and integration of more formal social studies concepts. Generalizations concerning the interaction of communities with the environment and other communities may be pursued using specific examples presented in the lessons. The industries of mining, farming, transportation, manufacturing, power generation, forestry, and fishing are touched upon. All provinces and provincial capitals are mentioned and a selection of flags and coats of arms are included. The remainder of this section is devoted to a list of alternative discussion questions and activities to facilitate the integration of concepts and content from social studies with mathematics.

# Discussion Questions and Activities

## Preview

*How many ethnic groups are represented in our school?*

1. Make a bar graph showing the various ethnic groups.
2. Provide a special time or opportunity for all students to discuss their heritage.
3. As a more extensive project, provide experiences with ethnic foods, dress, and customs.

*How can we help solve our communities' special problems?*

1. Have the students design anti-litter posters for the school.
2. Use a bar graph to show the progress of a litter collection campaign.

## Lesson 1

*Why is coal sold to Japan and elsewhere?*

Construct a flow chart showing the steps involved in getting a piece of coal from the ground to a Japanese steel plant.

*How long is the rail line from Sparwood to Roberts Bank?*

Make a map of the railway with distances indicated. Use the map for word problems involving distance.

## Lesson 2

*Why are cattle shipped from Brooks to Calgary?*

*Why might some bulls and cows be sent from Calgary to Brooks?*

1. Use pictographs to show the mass of various breeds of cattle.
2. Use the graph for discussion and word problems.

*In what ways is oil (petroleum) used?*

1. On a Canadian map mark the sites of the largest oil fields.
2. Compare the depth of typical oil wells to surface distances.
3. Construct a flow chart showing the steps involved in getting a kilogram of oil from the ground to an automobile in Quebec.

## Lesson 3

*What crops are grown in Saskatchewan and Manitoba? If we don't know, how might we find out?*

1. Construct a picture graph showing the regions of Saskatchewan and Manitoba where various crops are grown.
2. Put together a flow chart showing the steps involved in getting flour to a bakery.

## Lesson 4

*What do you think living in the Yukon (or Northwest Territories) would be like? What kinds of jobs might your parents do in the Yukon?*

1. Construct a map of the Yukon and Northwest Territories. Show the important towns with populations and distances indicated. Include special symbols  $\otimes$  to represent different kinds of industry.
2. With the class invent a game board using the Yukon and Northwest Territories map.

## Lesson 5

*What kinds of things in our classroom were manufactured (made by people)? How can we tell where some things were made?*

1. Make a list of classroom items that are manufactured and, where possible, the site of the industry.
2. Organize a three-digit subtraction assembly line composed of six students performing these tasks: regroup a ten if necessary, subtract ones, regroup a hundred if necessary, subtract tens, subtract hundreds, check the answer using mental estimation and recycle through the assembly line if necessary.

## Lesson 6

*What are the two languages of Canada? What other languages are common in our area? Why are the dams that produce electricity in Quebec so far away from the population centres such as Montreal?*

1. Read several short stories featuring life in French Quebec.
2. Establish a French Canada centre in the classroom. Include pictures, film strips, maps, and stories. Incorporate geography facts, vocabulary development, and role playing.



## Lesson 7

*Find the Maritime Provinces and their capitals on a map. Guess where we should place these industry markers on the map. Can you give a reason for your guess?*



Construct a table-top model of the Maritime Provinces. Show important towns with populations and distances. Include special symbols to designate different kinds of industry.

## Lesson 8

*Why do you think Canada and the provinces have flags (and coats of arms)? What are the names of governments that help us? Do they all do the same work for us? Name the citizens that represent us in government.*

1. Draw a simple diagram at the chalkboard showing how the federal, provincial, and municipal governments interact in their functions.
2. Use the school library to find all the provincial flags, emblems, and coats of arms. Let students devise matching and sorting activities.

# UNIT 10

## SUBTRACTION II



Unit 10 Objectives	Test Questions	Pages
A41	1-5	182-183
A42	6-10	184-185
A43	11-15	186-187
A44	16-22	190-191
M14	23-26	192-193
PS17	27	

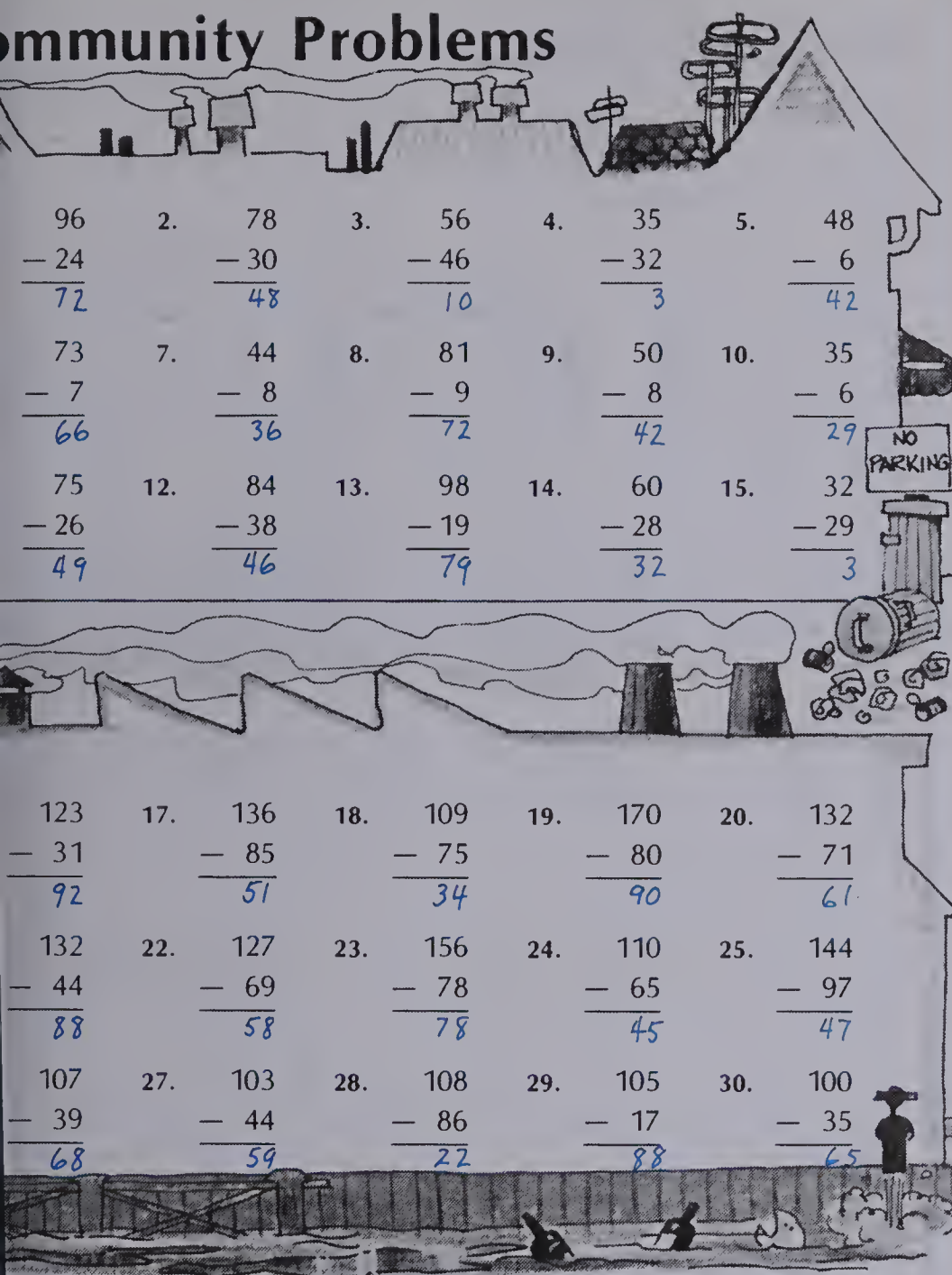
### Pretest

Subtract.

- |  |   |   |   |   |
|--|---|---|---|---|
| 1. $\begin{array}{r} 752 \\ - 127 \\ \hline 625 \end{array}$ | 2. $\begin{array}{r} 694 \\ - 225 \\ \hline 469 \end{array}$  | 3. $\begin{array}{r} 578 \\ - 349 \\ \hline 229 \end{array}$  | 4. $\begin{array}{r} 452 \\ - 213 \\ \hline 239 \end{array}$  | 5. $\begin{array}{r} 875 \\ - 527 \\ \hline 348 \end{array}$  |
| 6. $\begin{array}{r} 826 \\ - 186 \\ \hline 640 \end{array}$ | 7. $\begin{array}{r} 935 \\ - 93 \\ \hline 842 \end{array}$   | 8. $\begin{array}{r} 716 \\ - 424 \\ \hline 292 \end{array}$  | 9. $\begin{array}{r} 429 \\ - 273 \\ \hline 156 \end{array}$  | 10. $\begin{array}{r} 845 \\ - 591 \\ \hline 254 \end{array}$ |
| 11. $\begin{array}{r} 914 \\ - 85 \\ \hline 829 \end{array}$ | 12. $\begin{array}{r} 723 \\ - 467 \\ \hline 256 \end{array}$ | 13. $\begin{array}{r} 842 \\ - 594 \\ \hline 248 \end{array}$ | 14. $\begin{array}{r} 611 \\ - 232 \\ \hline 379 \end{array}$ | 15. $\begin{array}{r} 543 \\ - 179 \\ \hline 364 \end{array}$ |



# Community Problems



96 - 24 <hr/> 72	2. 78 - 30 <hr/> 48	3. 56 - 46 <hr/> 10	4. 35 - 32 <hr/> 3	5. 48 - 6 <hr/> 42
73 - 7 <hr/> 66	7. 44 - 8 <hr/> 36	8. 81 - 9 <hr/> 72	9. 50 - 8 <hr/> 42	10. 35 - 6 <hr/> 29
75 - 26 <hr/> 49	12. 84 - 38 <hr/> 46	13. 98 - 19 <hr/> 79	14. 60 - 28 <hr/> 32	15. 32 - 29 <hr/> 3

123 - 31 <hr/> 92	17. 136 - 85 <hr/> 51	18. 109 - 75 <hr/> 34	19. 170 - 80 <hr/> 90	20. 132 - 71 <hr/> 61
132 - 44 <hr/> 88	22. 127 - 69 <hr/> 58	23. 156 - 78 <hr/> 78	24. 110 - 65 <hr/> 45	25. 144 - 97 <hr/> 47
107 - 39 <hr/> 68	27. 103 - 44 <hr/> 59	28. 108 - 86 <hr/> 22	29. 105 - 17 <hr/> 88	30. 100 - 35 <hr/> 65

181

## UNIT 10

## PREVIEW

### Suggestions

Canadian communities are enriched by people from diverse cultural and ethnic backgrounds. Use the illustration on page 180 to discuss the concepts of community, diverse cultures, Canada, and multi-culturalism.

Water and air pollution, litter and urban sprawl are problems in many Canadian communities. Use the illustration on page 181 to identify and discuss special problems of your local community.

Review the subtraction procedure. Use number blocks or other place-value materials to model and render each step meaningful. (Refer to Unit 5 for specific teaching suggestions.)

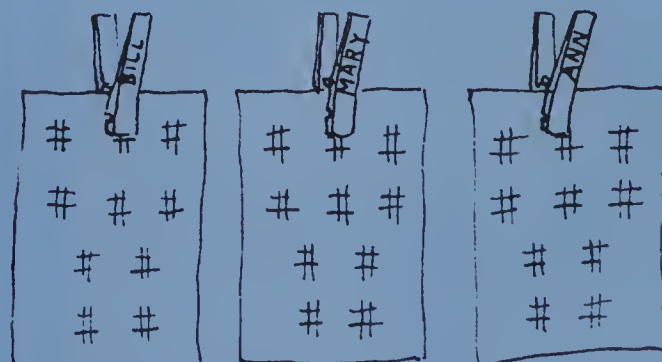
78 - 20 <hr/> 58	65 - 8 <hr/> 57	45 - 19 <hr/> 26
134 - 17 <hr/> 117	122 - 66 <hr/> 56	102 - 18 <hr/> 84

### About the Page

The problems on page 181 are arranged to facilitate the diagnosis of subtraction difficulties. The problems relate to prior objectives as follows: A16—1 to 5, A17—6 to 10, A18—11 to 15, A19—16 to 25, and A20—26 to 30.

### Reinforcement

Use subtraction form sheets (each with room for ten problems) and clothes pins to create a classroom Community Question Centre. Each student devises a subtraction question sheet and an answer sheet. Later the students may choose their neighbours' sheets to complete.



400 - 135 <hr/> 265	17. 406 - 127 <hr/> 279	18. 406 - 126 <hr/> 280	19. 900 - 26 <hr/> 874	20. 801 - 39 <hr/> 762
---------------------------	-------------------------------	-------------------------------	------------------------------	------------------------------

d the difference.

358 and 642 <b>284</b>	22. 417 and 258 <b>159</b>
\$4.53 and \$7.08 <b>\$2.55</b>	24. \$9.15 and \$7.49 <b>\$1.66</b>
\$1.95 and \$0.99 <b>\$0.96</b>	26. \$4.58 and \$6.05 <b>\$1.47</b>

ve. Show both steps.

Mary has \$6.31.

She spent \$1.75 of it.

If she gets \$3.20 more, how much will she have? **\$ 7.76**

# UNIT 10 LESSON 1

## Objective A41

Subtract 3-digit numerals with regrouping from the tens place.

## Introducing the Lesson

A railroad and shipping transportation system is used to get coal from British Columbia to factories in Japan.

Have the students recall that 1 ten = 10 ones.

Focus on trading 1 ten for 10 ones. Use number blocks to model the process of regrouping numerals. Have the students name the missing numbers.

2 15 <del>8 8</del>	<input type="checkbox"/> <input type="checkbox"/> <del>8 8</del>	<input type="checkbox"/> <input type="checkbox"/> <del>4 4</del>
<input type="checkbox"/> <input type="checkbox"/> 2 <del>8 8</del>	<input type="checkbox"/> <input type="checkbox"/> 7 <del>8 8</del>	<input type="checkbox"/> <input type="checkbox"/> 4 <del>4 4</del>

## Teaching the Lesson

Remind the students that subtraction requires trading decisions. While subtracting and upon determining the value of each place in these examples, have the students decide whether trading is necessary.

342 -118	380 - 35	783 -423	525 - 8
-------------	-------------	-------------	------------

Use number blocks on a subtraction grid to model 3-digit subtraction.

a.	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
-			

$$\begin{array}{r} 2 \ 3 \ 5 \\ -1 \ 1 \ 8 \\ \hline \end{array}$$

b.	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
-			

$$\begin{array}{r} 2 \ 15 \\ 2 \ ~~8 \ 8~~ \\ -1 \ 1 \ 8 \\ \hline \end{array}$$

c.	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
-			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
			<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

$$\begin{array}{r} 2 \ 15 \\ 2 \ ~~8 \ 8~~ \\ -1 \ 1 \ 8 \\ \hline 7 \end{array}$$

d.			
-	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

$$\begin{array}{r} 2 \ 15 \\ 2 \ ~~8 \ 8~~ \\ -1 \ 1 \ 8 \\ \hline 1 \ 1 \ 7 \end{array}$$

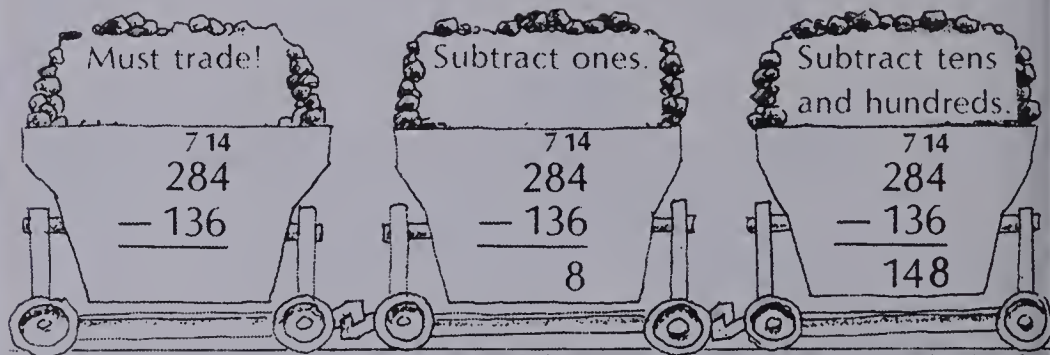
# Trading a Ten

284 hopper cars are empty.

136 get filled with coal.

How many are empty now?

$$4 - 6 = ??$$



## EXERCISES

Trade 1 ten for 10 ones.

1. 735	2. 416	3. 562	4. 270	5. 413
--------	--------	--------	--------	--------

Do you need to trade? (yes or no) Decide and subtract.

6. 862 yes - 328 534	7. 964 yes - 137 827	8. 700 no - 300 400	9. 345 no - 123 222	10. 782 yes - 524 258
11. 567 no - 357 210	12. 436 yes - 128 308	13. 648 no - 420 228	14. 359 no - 251 108	15. 640 yes - 218 422
16. 364 no - 24 340	17. 248 yes - 139 109	18. 926 yes - 907 19	19. 311 yes - 2 309	20. 562 yes - 37 525

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## Using the Exercises

- Questions 1 to 5 concentrate on trading 1 ten for 10 ones.
- Questions 6 to 20 require explicit trading decisions before subtracting. Some of the problems require regrouping a ten.



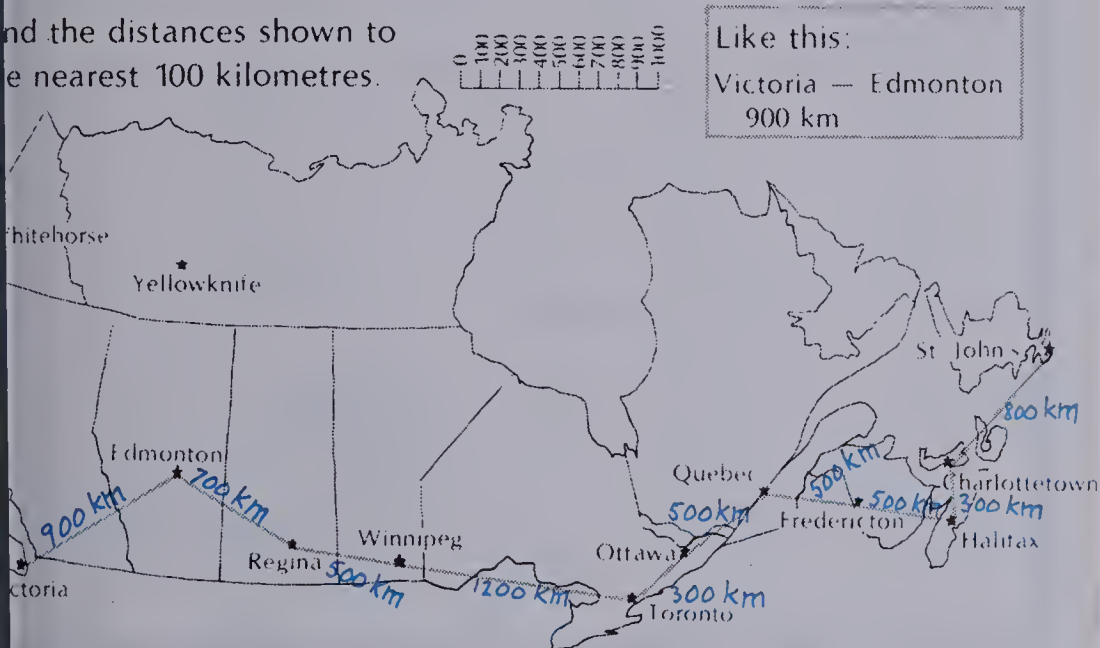
## PRACTICE

Subtract.

A. $\begin{array}{r} 362 \\ -146 \\ \hline 216 \end{array}$	B. $\begin{array}{r} 450 \\ -335 \\ \hline 115 \end{array}$	C. $\begin{array}{r} 675 \\ -253 \\ \hline 422 \end{array}$	D. $\begin{array}{r} 928 \\ -809 \\ \hline 119 \end{array}$	E. $\begin{array}{r} 365 \\ -158 \\ \hline 207 \end{array}$
F. $\begin{array}{r} 735 \\ -717 \\ \hline 18 \end{array}$	G. $\begin{array}{r} 892 \\ -827 \\ \hline 65 \end{array}$	H. $\begin{array}{r} 648 \\ -327 \\ \hline 321 \end{array}$	I. $\begin{array}{r} 326 \\ -219 \\ \hline 107 \end{array}$	J. $\begin{array}{r} 774 \\ -667 \\ \hline 107 \end{array}$
K. $\begin{array}{r} 324 \\ -319 \\ \hline 5 \end{array}$	L. $\begin{array}{r} 870 \\ -749 \\ \hline 121 \end{array}$	M. $\begin{array}{r} 926 \\ -315 \\ \hline 611 \end{array}$	N. $\begin{array}{r} 387 \\ -68 \\ \hline 319 \end{array}$	O. $\begin{array}{r} 294 \\ -88 \\ \hline 206 \end{array}$
P. $\begin{array}{r} 375 \\ -37 \\ \hline 338 \end{array}$	Q. $\begin{array}{r} 654 \\ -335 \\ \hline 319 \end{array}$	R. $\begin{array}{r} 430 \\ -7 \\ \hline 423 \end{array}$	S. $\begin{array}{r} 860 \\ -846 \\ \hline 14 \end{array}$	T. $\begin{array}{r} 276 \\ -268 \\ \hline 8 \end{array}$

## Canadian Capitals

Find the distances shown to the nearest 100 kilometres.



183

## Extra Practice

Subtract.

Find the name of a city, unscramble the letters used.

$\begin{array}{r} 734 \\ -528 \\ \hline 206 \end{array}$	$\begin{array}{r} 576 \\ -246 \\ \hline 330 \text{ R} \end{array}$	$\begin{array}{r} 460 \\ -380 \\ \hline 80 \end{array}$	$\begin{array}{r} 247 \\ -92 \\ \hline 155 \text{ U} \end{array}$
$\begin{array}{r} 364 \\ -148 \\ \hline 216 \text{ V} \end{array}$	$\begin{array}{r} 678 \\ -198 \\ \hline 480 \end{array}$	$\begin{array}{r} 382 \\ -9 \\ \hline 373 \text{ C} \end{array}$	$\begin{array}{r} 856 \\ -407 \\ \hline 449 \text{ O} \end{array}$
$\begin{array}{r} 720 \\ -115 \\ \hline 605 \text{ E} \end{array}$	$\begin{array}{r} 485 \\ -269 \\ \hline 216 \text{ V} \end{array}$	$\begin{array}{r} 349 \\ -25 \\ \hline 324 \text{ A} \end{array}$	$\begin{array}{r} 571 \\ -428 \\ \hline 143 \text{ N} \end{array}$

## Worksheet A41

Pages 182-183

A	324	N	143
C	373	O	449
D	448	R	330
E	605	U	155
F	374	V	216
I	615	W	331

City: VANCOUVER

## Assigning the Practice

Minimum: A-T

Average: A-T

Enriched: A-T

Secret Message:

115-422 321-216-14

65-423-207-216-8

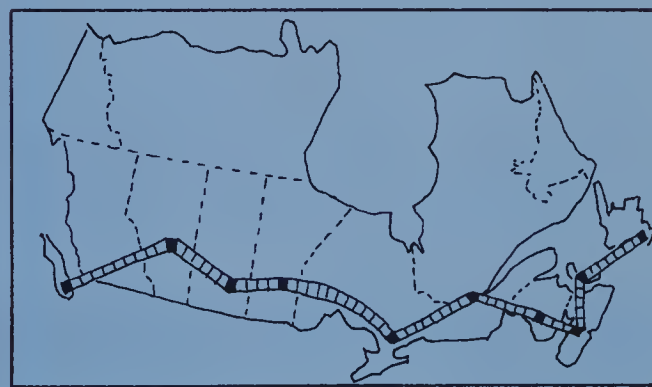
18-206-423-207-14-8-14

Decoded message:

B.C. has great forests.

## Reinforcement

Provide a map of Canada with a path connecting the capitals. Each player places a marker at a different capital ("home"). Ten letters, addressed to cities across Canada, are dealt to each player. In turn, players roll a die and move the number of spaces indicated in any direction to reach an address they hold. When a destination city is reached, the player must complete the subtraction problem on the back of the letter. In the case of a mistake, the letter may not be delivered until another letter has been successfully delivered to a different city. The winner is the first person to deliver all ten letters and return to the "home" capital.



## Enrichment

1. Before assigning *Canadian Capitals* at the bottom of page 183 show the students how to use a straightedge to compare a distance to the kilometre scale.

2. Let the students read *From Sea to Shining Sea*. Organize teams to read suitable books and stories about Canada. On Fridays move each team's airplane forward the number of kilometres equal to the number of pages read by the team.

# UNIT 10 LESSON 2

## Objective A42

Subtract 3-digit numerals with regrouping from the hundreds place.

## Introducing the Lesson

Calgary is one centre for the cattle industry in Alberta.

Discuss the word problem on page 184. Use number blocks to model the trading of 1 hundred for 10 tens.

a.


$$\begin{array}{r} 346 \\ -175 \\ \hline \end{array}$$

b.


$$\begin{array}{r} 214 \\ \cancel{3} \cancel{4} 6 \\ -175 \\ \hline 1 \end{array}$$

c.


$$\begin{array}{r} 214 \\ \cancel{3} \cancel{4} 6 \\ -175 \\ \hline 171 \end{array}$$

## Teaching the Lesson

Focus on trading 1 hundred for 10 tens. Use number blocks to model the process of regrouping numerals.

$$\begin{array}{r} 114 \\ \cancel{1} \cancel{1} 4 \\ \cancel{3} \cancel{3} 2 \quad \cancel{2} \cancel{0} 5 \quad \cancel{1} \cancel{1} 6 \quad \cancel{1} \cancel{1} 2 \end{array}$$

Ask the students what decision subtraction requires. *Trading decisions.* Discuss examples.

$$\begin{array}{r} 342 \\ -171 \\ \hline \end{array} \quad \begin{array}{r} 380 \\ -90 \\ \hline \end{array} \quad \begin{array}{r} 709 \\ -262 \\ \hline \end{array} \quad \begin{array}{r} 927 \\ -384 \\ \hline \end{array} \quad \begin{array}{r} 518 \\ -474 \\ \hline \end{array}$$

# Trading a Hundred

346 cattle on a ranch near Brooks  
175 are sent to Calgary.  
How many cattle are left?



Trade? Subtract ones.      Trade? 1 hundred = 10 tens      Subtract tens and hundreds.

## EXERCISES

Trade 1 hundred for 10 tens.

1. $\begin{array}{r} 514 \\ \cancel{6} \cancel{4} 5 \end{array}$	2. $\begin{array}{r} 612 \\ \cancel{7} \cancel{2} 0 \end{array}$	3. $\begin{array}{r} 215 \\ \cancel{3} \cancel{5} 6 \end{array}$	4. $\begin{array}{r} 514 \\ \cancel{6} \cancel{4} 8 \end{array}$	5. $\begin{array}{r} 610 \\ \cancel{7} \cancel{0} 5 \end{array}$
6. $\begin{array}{r} 110 \\ \cancel{2} \cancel{0} 3 \end{array}$	7. $\begin{array}{r} 418 \\ \cancel{5} \cancel{8} 3 \end{array}$	8. $\begin{array}{r} 219 \\ \cancel{3} \cancel{9} 2 \end{array}$	9. $\begin{array}{r} 314 \\ \cancel{4} \cancel{4} 5 \end{array}$	10. $\begin{array}{r} 611 \\ \cancel{7} \cancel{1} 5 \end{array}$

Subtract. Did you need to trade? (yes or no)

11. $\begin{array}{r} 520 \\ \text{yes} - 360 \\ \hline 160 \end{array}$	12. $\begin{array}{r} 539 \\ \text{yes} - 265 \\ \hline 274 \end{array}$	13. $\begin{array}{r} 365 \\ \text{no} - 325 \\ \hline 40 \end{array}$	14. $\begin{array}{r} 756 \\ \text{yes} - 275 \\ \hline 481 \end{array}$	15. $\begin{array}{r} 937 \\ \text{yes} - 573 \\ \hline 364 \end{array}$
16. $\begin{array}{r} 842 \\ \text{yes} - 371 \\ \hline 471 \end{array}$	17. $\begin{array}{r} 809 \\ \text{yes} - 597 \\ \hline 212 \end{array}$	18. $\begin{array}{r} 738 \\ \text{no} - 527 \\ \hline 211 \end{array}$	19. $\begin{array}{r} 452 \\ \text{yes} - 162 \\ \hline 290 \end{array}$	20. $\begin{array}{r} 540 \\ \text{yes} - 360 \\ \hline 180 \end{array}$

## Using the Exercises

- Questions 1 to 10 concentrate on trading 1 hundred for 10 tens.
- Questions 11 to 20 are 3-digit subtraction problems. Some require regrouping from the hundreds place.



## PRACTICE

Subtract.

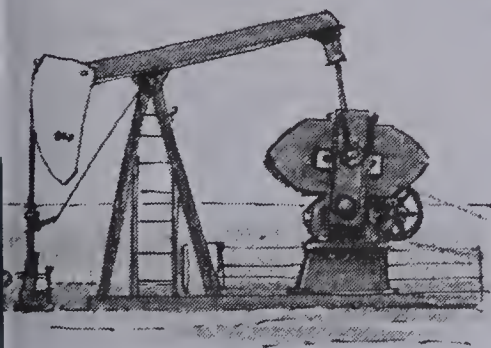
A. $\begin{array}{r} 438 \\ -143 \\ \hline 295 \end{array}$	B. $\begin{array}{r} 922 \\ -682 \\ \hline 240 \end{array}$	C. $\begin{array}{r} 830 \\ -620 \\ \hline 210 \end{array}$	D. $\begin{array}{r} 607 \\ -384 \\ \hline 223 \end{array}$	E. $\begin{array}{r} 607 \\ -293 \\ \hline 314 \end{array}$
F. $\begin{array}{r} 926 \\ -472 \\ \hline 454 \end{array}$	G. $\begin{array}{r} 863 \\ -170 \\ \hline 693 \end{array}$	H. $\begin{array}{r} 558 \\ -465 \\ \hline 93 \end{array}$	I. $\begin{array}{r} 682 \\ -342 \\ \hline 340 \end{array}$	J. $\begin{array}{r} 370 \\ -280 \\ \hline 90 \end{array}$
K. $\begin{array}{r} 634 \\ -63 \\ \hline 571 \end{array}$	L. $\begin{array}{r} 756 \\ -94 \\ \hline 662 \end{array}$	M. $\begin{array}{r} 230 \\ -50 \\ \hline 180 \end{array}$	N. $\begin{array}{r} 504 \\ -84 \\ \hline 420 \end{array}$	O. $\begin{array}{r} 378 \\ -90 \\ \hline 288 \end{array}$

Change to vertical form. Then subtract.

P. $935 - 84$ <b>851</b>	Q. $563 - 40$ <b>523</b>	R. $657 - 83$ <b>574</b>
S. $739 - 592$ <b>147</b>	T. $208 - 154$ <b>54</b>	U. $795 - 345$ <b>450</b>
V. $725 - 374$ <b>351</b>	W. $264 - 183$ <b>81</b>	X. $540 - 290$ <b>250</b>

## Drilling Deeper

How many metres for each? Put the answers in order.



- A  $3000 \text{ m} + 600 \text{ m} + 50 \text{ m} + 9 \text{ m}$   
**3659 m** 4.  
 A  $8 \text{ m} + 70 \text{ m} + 300 \text{ m} + 4000 \text{ m}$   
**4378 m** 1.  
 A  $20 \text{ m} + 100 \text{ m} + 2000 \text{ m} + 6 \text{ m}$   
**2126 m** 5.  
 A  $4000 \text{ m} + 6 \text{ m} + 300 \text{ m} + 20 \text{ m}$   
**4326 m** 2.  
 A  $3 \text{ m} + 2000 \text{ m} + 60 \text{ m}$   
**2063 m** 6.  
 A  $700 \text{ m} + 10 \text{ m} + 3000 \text{ m}$   
**3710 m** 3.

185

## Assigning the Practice

Minimum: A-V

Average: A-X

Enriched: A-X

Secret message:

81-93-295-54 295-574-314

54-295-574 147-295-420-223-147?

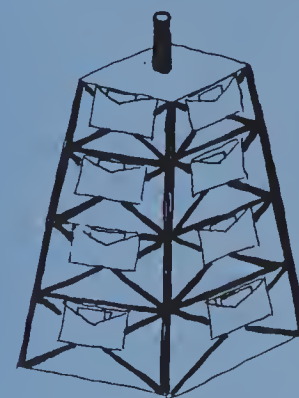
Decoded message:

What are tar sands?

## Reinforcement

1. Before assigning *Drilling Deeper* at the bottom of page 185, discuss expanded form and the ordering of numerals to 9999. Investigate the depth of existing oil wells.

2. Make an oil derrick from heavy poster board. Place four envelopes at each level to hold subtraction work cards. If students work their way up one face to the top, they receive *Petro King* badges.



## Enrichment

Design a simple road map or railroad map for your province which includes distances between locations. Write word problems that refer to the map which deal with the three interpretations of subtraction: take away, missing addend, and comparison.

1. take away

Joe was to drive 423 km today. He drove only 62 km. How much farther does he have to go?

2. missing addend

Tara planned to travel 479 km. She has 86 km more to go. How far has she travelled so far?

3. comparison

Sarah drove 318 km yesterday and 164 km today. How much less did she drive today?

## Extra Practice

## Worksheet A42

Pages 184-185

Change to vertical form. Then subtract.

1. $\begin{array}{r} 386 \\ -92 \\ \hline 294 \end{array}$	2. $\begin{array}{r} 528 \\ -438 \\ \hline 90 \end{array}$	3. $\begin{array}{r} 716 \\ -43 \\ \hline 673 \end{array}$
4. $\begin{array}{r} 634 \\ -234 \\ \hline 400 \end{array}$	5. $\begin{array}{r} 785 \\ -784 \\ \hline 1 \end{array}$	6. $\begin{array}{r} 635 \\ -92 \\ \hline 543 \end{array}$
7. $\begin{array}{r} 423 \\ -382 \\ \hline 41 \end{array}$	8. $\begin{array}{r} 928 \\ -727 \\ \hline 201 \end{array}$	9. $\begin{array}{r} 456 \\ -386 \\ \hline 70 \end{array}$

## Objective A43

Subtract 3-digit numerals with regrouping.

## Introducing the Lesson

Carefully discuss the example on page 186. Use number blocks with a subtraction grid to demonstrate each step in the process.

Review that 1 hundred = 10 tens and that 1 ten = 10 ones. Stress the act of regrouping numerals using the steps shown. First trade a ten and then a hundred.

Steps:

$$736 \rightarrow \begin{array}{r} 2 \ 16 \\ 7 \ 3 \ 6 \end{array} \rightarrow \begin{array}{r} 6 \ 12 \ 16 \\ 7 \ 3 \ 6 \end{array}$$

Now try: 382, 745, 710, 321, and 127.

## Teaching the Lesson

Subtracting 3-digit numerals requires several decisions. Ask the students what a **trading decision** might be. While completing each example, determine how many trades (regroupings) are necessary for each.

$$\begin{array}{r} 725 \\ -168 \\ \hline \end{array}$$

$$\begin{array}{r} 837 \\ -125 \\ \hline \end{array}$$

$$\begin{array}{r} 647 \\ -308 \\ \hline \end{array}$$

$$\begin{array}{r} 734 \\ -272 \\ \hline \end{array}$$

$$\begin{array}{r} 324 \\ -188 \\ \hline \end{array}$$

$$\begin{array}{r} 432 \\ -367 \\ \hline \end{array}$$

Before subtracting, have the students try to estimate how many trades will be necessary for each question in the Practice section on page 187. Use number blocks to help explain some of their estimates.

# Three-Place Subtraction

	Trade a ten?	Subtract ones.	Trade a hundred?	Subtract tens.	Subtract hundreds.
$\begin{array}{r} 524 \\ -248 \\ \hline \end{array}$	yes	$\begin{array}{r} 1 \ 14 \\ 524 \\ -248 \\ \hline 6 \end{array}$	yes	$\begin{array}{r} 4 \ 11 \ 14 \\ 524 \\ -248 \\ \hline 76 \end{array}$	$\begin{array}{r} 4 \ 11 \ 14 \\ 524 \\ -248 \\ \hline 276 \end{array}$

## EXERCISES

Trade a ten. Then trade a hundred.

$$\begin{array}{r} 2 \ 14 \ 16 \\ 356 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \ 11 \ 17 \\ 427 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \ 12 \ 15 \\ 835 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \ 13 \ 13 \\ 643 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \ 16 \ 11 \\ 671 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \ 10 \ 12 \\ 612 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \ 14 \ 17 \\ 857 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \ 11 \ 14 \\ 924 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \ 15 \ 10 \\ 360 \\ -248 \\ \hline \end{array}$$

$$\begin{array}{r} 1 \ 16 \ 10 \\ 270 \\ -248 \\ \hline \end{array}$$

Subtract. Did you need 2 trades, 1 trade, or 0 trades?

$$\begin{array}{r} 2 \\ 835 \\ -387 \\ \hline 448 \end{array}$$

$$\begin{array}{r} 0 \\ 648 \\ -340 \\ \hline 308 \end{array}$$

$$\begin{array}{r} 2 \\ 643 \\ -196 \\ \hline 447 \end{array}$$

$$\begin{array}{r} 2 \\ 356 \\ -189 \\ \hline 167 \end{array}$$

$$\begin{array}{r} 0 \\ 658 \\ -247 \\ \hline 411 \end{array}$$

$$\begin{array}{r} 2 \\ 857 \\ -578 \\ \hline 279 \end{array}$$

$$\begin{array}{r} 1 \\ 628 \\ -577 \\ \hline 51 \end{array}$$

$$\begin{array}{r} 2 \\ 924 \\ -786 \\ \hline 138 \end{array}$$

$$\begin{array}{r} 1 \\ 372 \\ -346 \\ \hline 26 \end{array}$$

$$\begin{array}{r} 2 \\ 671 \\ -295 \\ \hline 376 \end{array}$$

$$\begin{array}{r} 2 \\ 555 \\ -288 \\ \hline 267 \end{array}$$

$$\begin{array}{r} 2 \\ 360 \\ -164 \\ \hline 196 \end{array}$$

$$\begin{array}{r} 1 \\ 457 \\ -239 \\ \hline 218 \end{array}$$

$$\begin{array}{r} 2 \\ 612 \\ -148 \\ \hline 464 \end{array}$$

$$\begin{array}{r} 1 \\ 648 \\ -283 \\ \hline 365 \end{array}$$

$$\begin{array}{r} 2 \\ 427 \\ -49 \\ \hline 378 \end{array}$$

$$\begin{array}{r} 1 \\ 752 \\ -81 \\ \hline 671 \end{array}$$

$$\begin{array}{r} 2 \\ 626 \\ -49 \\ \hline 577 \end{array}$$

$$\begin{array}{r} 1 \\ 593 \\ -187 \\ \hline 406 \end{array}$$

$$\begin{array}{r} 2 \\ 270 \\ -185 \\ \hline 85 \end{array}$$

## Using the Exercises

- Questions 1 to 10 involve two trades.
- Questions 11 to 30 are 3-digit subtraction questions requiring trading decisions. Do a few orally with discussion.



## PRACTICE

Subtract.

1.  $\begin{array}{r} 823 \\ - 648 \\ \hline 175 \end{array}$
2.  $\begin{array}{r} 569 \\ - 79 \\ \hline 490 \end{array}$
3.  $\begin{array}{r} 435 \\ - 276 \\ \hline 159 \end{array}$
4.  $\begin{array}{r} 770 \\ - 275 \\ \hline 495 \end{array}$
5.  $\begin{array}{r} 627 \\ - 19 \\ \hline 608 \end{array}$
6.  $\begin{array}{r} 932 \\ - 866 \\ \hline 66 \end{array}$
7.  $\begin{array}{r} 465 \\ - 326 \\ \hline 139 \end{array}$
8.  $\begin{array}{r} 376 \\ - 372 \\ \hline 4 \end{array}$
9.  $\begin{array}{r} 812 \\ - 67 \\ \hline 745 \end{array}$
10.  $\begin{array}{r} 650 \\ - 271 \\ \hline 379 \end{array}$
11.  $\begin{array}{r} 217 \\ - 49 \\ \hline 168 \end{array}$
12.  $\begin{array}{r} 986 \\ - 937 \\ \hline 49 \end{array}$
13.  $\begin{array}{r} 233 \\ - 188 \\ \hline 45 \end{array}$
14.  $\begin{array}{r} 440 \\ - 352 \\ \hline 88 \end{array}$
15.  $\begin{array}{r} 627 \\ - 458 \\ \hline 169 \end{array}$
16.  $\begin{array}{r} 762 \\ - 292 \\ \hline 470 \end{array}$
17.  $\begin{array}{r} 712 \\ - 165 \\ \hline 547 \end{array}$
18.  $\begin{array}{r} 328 \\ - 4 \\ \hline 324 \end{array}$
19.  $\begin{array}{r} 762 \\ - 297 \\ \hline 465 \end{array}$
20.  $\begin{array}{r} 564 \\ - 75 \\ \hline 489 \end{array}$
21.  $\begin{array}{r} 693 \\ - 598 \\ \hline 95 \end{array}$
22.  $\begin{array}{r} 543 \\ - 527 \\ \hline 16 \end{array}$
23.  $\begin{array}{r} 736 \\ - 386 \\ \hline 350 \end{array}$
24.  $\begin{array}{r} 960 \\ - 877 \\ \hline 83 \end{array}$
25.  $\begin{array}{r} 313 \\ - 176 \\ \hline 137 \end{array}$
26.  $\begin{array}{r} 711 \\ - 86 \\ \hline 625 \end{array}$
27.  $\begin{array}{r} 633 \\ - 125 \\ \hline 508 \end{array}$
28.  $\begin{array}{r} 922 \\ - 479 \\ \hline 443 \end{array}$
29.  $\begin{array}{r} 544 \\ - 84 \\ \hline 460 \end{array}$
30.  $\begin{array}{r} 355 \\ - 266 \\ \hline 89 \end{array}$

## Meet the Wheat



1. One stalk of wheat is 95 cm tall. Another is 87 cm high. What is the difference? **8 cm**
2. If it takes 375 grains of wheat to fill a container, how many grains will it take to fill it twice? **750**
3. List 5 foods made from wheat.

Examples: cereal, bread, pastry, pasta, rolls, .... 187

## Assigning the Practice

Minimum: 1-30

Average: 1-30

Enriched: 1-30

## Reinforcement

1. Discuss the importance of wheat as a source of food for the consumer and as a source of employment for the producer. After assigning *Meet The Wheat* at the bottom of page 187, help the students prepare a collage featuring pictures of foodstuffs containing wheat flour.

2. For students having difficulty properly aligning the places of the numerals, provide subtraction problems with a lattice format. Explain that a box may never keep a numeral larger than 10, but must trade.

$$\begin{array}{|c|c|c|} \hline 3 & 8 & 2 \\ \hline - & 7 & 9 \\ \hline \end{array} \quad \begin{array}{|c|c|c|} \hline 8 & 2 & 4 \\ \hline - & 9 & 3 \\ \hline \end{array} \quad \begin{array}{|c|c|c|} \hline 4 & 5 & 6 \\ \hline - & 1 & 8 & 9 \\ \hline \end{array}$$

## Enrichment

Challenge students to make "difficult" problems into "easy" ones by adding an appropriate number to both the top (minuend) and bottom (subtrahend) numbers.

$$\begin{array}{r} 483 \\ - 97 \\ \hline \end{array} \quad \begin{array}{r} 830 \\ - 496 \\ \hline \end{array} \quad \begin{array}{r} 762 \\ - 75 \\ \hline \end{array} \quad \begin{array}{r} 431 \\ - 275 \\ \hline \end{array}$$

For example:

$$\begin{array}{r} 483 \\ - 97 \\ \hline \end{array} \rightarrow \begin{array}{r} 486 \\ - 100 \\ \hline 386 \end{array} \xrightarrow{\begin{array}{c} \text{Add 3} \\ \text{Add 3} \end{array}} \begin{array}{r} 483 \\ - 97 \\ \hline 386 \end{array}$$

## Extra Practice

## Worksheet A43

Pages 186-187

Subtract.

Find the name of a prairie province, unscramble the letters used.

- $\begin{array}{r} 536 \\ - 287 \\ \hline 249 \end{array}$
- $\begin{array}{r} 415 \\ - 87 \\ \hline 328 \text{ A} \end{array}$
- $\begin{array}{r} 124 \\ - 104 \\ \hline 20 \end{array}$
- $\begin{array}{r} 320 \\ - 186 \\ \hline 134 \text{ T} \end{array}$
- $\begin{array}{r} 886 \\ - 92 \\ \hline 794 \text{ O} \end{array}$
- $\begin{array}{r} 734 \\ - 9 \\ \hline 725 \text{ A} \end{array}$
- $\begin{array}{r} 222 \\ - 133 \\ \hline 89 \text{ N} \end{array}$
- $\begin{array}{r} 418 \\ - 109 \\ \hline 309 \text{ I} \end{array}$
- $\begin{array}{r} 385 \\ - 126 \\ \hline 259 \end{array}$
- $\begin{array}{r} 469 \\ - 85 \\ \hline 384 \text{ B} \end{array}$
- $\begin{array}{r} 247 \\ - 48 \\ \hline 199 \text{ M} \end{array}$
- $\begin{array}{r} 677 \\ - 670 \\ \hline 7 \end{array}$

S	165	T	134
A	328	W	385
K	482	O	794
N	89	B	384
A	725	I	309
S	724	M	199

Province: **MANITOBA**

# UNIT 10 LESSON 4

## Objective G2

Identify equal and unequal portions.

### Introducing the Lesson

Cut an object (an apple or an orange) into unequal portions. Ask several students which piece they would prefer. Describe the portions as unequal.

With a collection of objects that can be arranged or broken apart, investigate the concept of **equal** and **unequal** portions. Be certain to include examples with more than two portions and, also, examples which are difficult to judge.



### Teaching the Lesson

Print "equal" and "unequal" on the chalkboard. Have the students classify these number pairs under one of the categories.

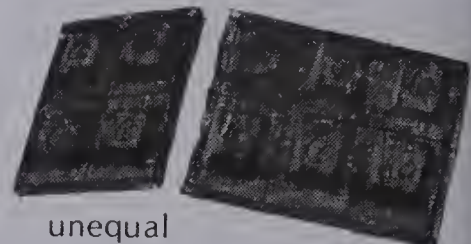
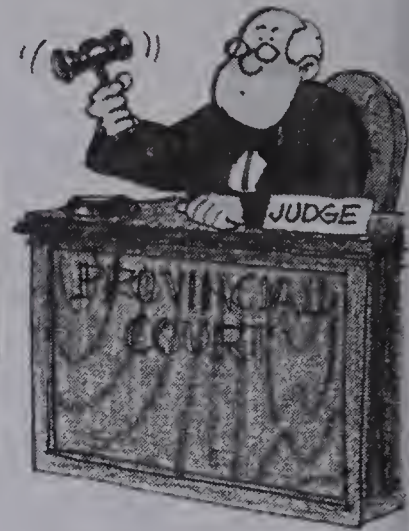
- $84 - 32$  and  $54 - 2$
- $325 + 290$  and  $846 - 171$
- $922 - 277$  and  $854 - 207$
- $5 \times 4$  and  $457 - 337$

Find the Yukon and the Northwest Territories on a map or globe. Discuss how they are unequal in size and in population.

## Equal and Unequal Portions

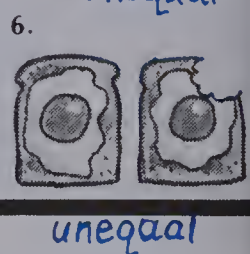
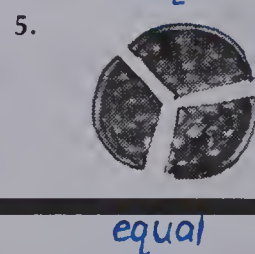
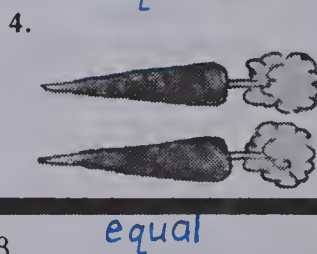
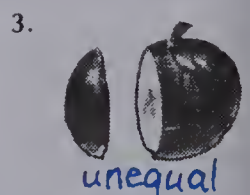
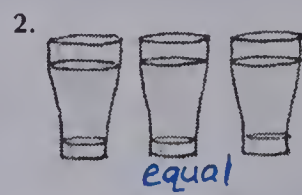
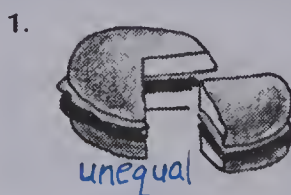
Help the judge.

Are the portions **equal** or **unequal**?



### EXERCISES

Are the portions equal or unequal?



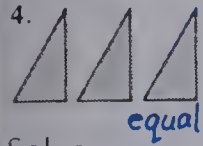
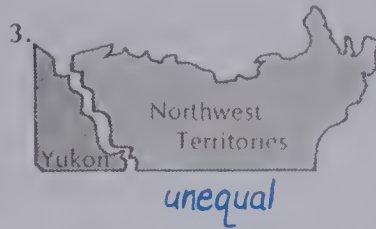
### Using the Exercises

- Questions 1 to 6 have the students identify equal and unequal portions.



## PRACTICE

Are the portions equal or unequal?



Solve.

6. 32 people played "tug-of-war".  
17 were on one side.  
Were the sides equal? *no*
7. Mary, Joni, and Sam collected 248 pennies.  
Mary and Joni both have 83¢.  
Sam has the rest.  
Do they have equal shares? *no*

## REVIEW

Subtract.

A41	1. $\begin{array}{r} 736 \\ -618 \\ \hline 118 \end{array}$	2. $\begin{array}{r} 442 \\ -208 \\ \hline 234 \end{array}$	3. $\begin{array}{r} 530 \\ -514 \\ \hline 16 \end{array}$	4. $\begin{array}{r} 874 \\ -621 \\ \hline 253 \end{array}$	5. $\begin{array}{r} 685 \\ -47 \\ \hline 638 \end{array}$
A42	6. $\begin{array}{r} 736 \\ -284 \\ \hline 452 \end{array}$	7. $\begin{array}{r} 442 \\ -182 \\ \hline 260 \end{array}$	8. $\begin{array}{r} 530 \\ -490 \\ \hline 40 \end{array}$	9. $\begin{array}{r} 874 \\ -93 \\ \hline 781 \end{array}$	10. $\begin{array}{r} 685 \\ -683 \\ \hline 2 \end{array}$
A43	11. $\begin{array}{r} 736 \\ -359 \\ \hline 377 \end{array}$	12. $\begin{array}{r} 442 \\ -276 \\ \hline 166 \end{array}$	13. $\begin{array}{r} 530 \\ -142 \\ \hline 388 \end{array}$	14. $\begin{array}{r} 874 \\ -785 \\ \hline 89 \end{array}$	15. $\begin{array}{r} 685 \\ -86 \\ \hline 599 \end{array}$

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## Assigning the Practice

Minimum: 1-6

Average: 1-6

Enriched: 1-7

## Review Exercises

Questions	Objective	Pages
1-5	A41	182-183
6-10	A42	184-185
11-15	A43	186-187

## Reinforcement

Opportunities for discussing equal and unequal arise naturally in every classroom. Take advantage of situations like these to investigate the meanings of equal and unequal.

- sharing classroom gym equipment
- sharing treats at a party
- the size of homework assignments
- the size of the students' pencils

## Enrichment

1. Review the meanings of  $>$  and  $<$ . Introduce  $\neq$  as the symbol for *not equal*. Ask some students to prepare work cards for others to sort into equal and unequal sets.



$$2 \times 3 \bigcirc 325 - 219$$

2. This lesson leads naturally into an investigation of simple equations involving one and two unknowns.

$$38 + 15 = \blacksquare - 19$$

$$\blacktriangle + 16 = 85 - \blacksquare$$

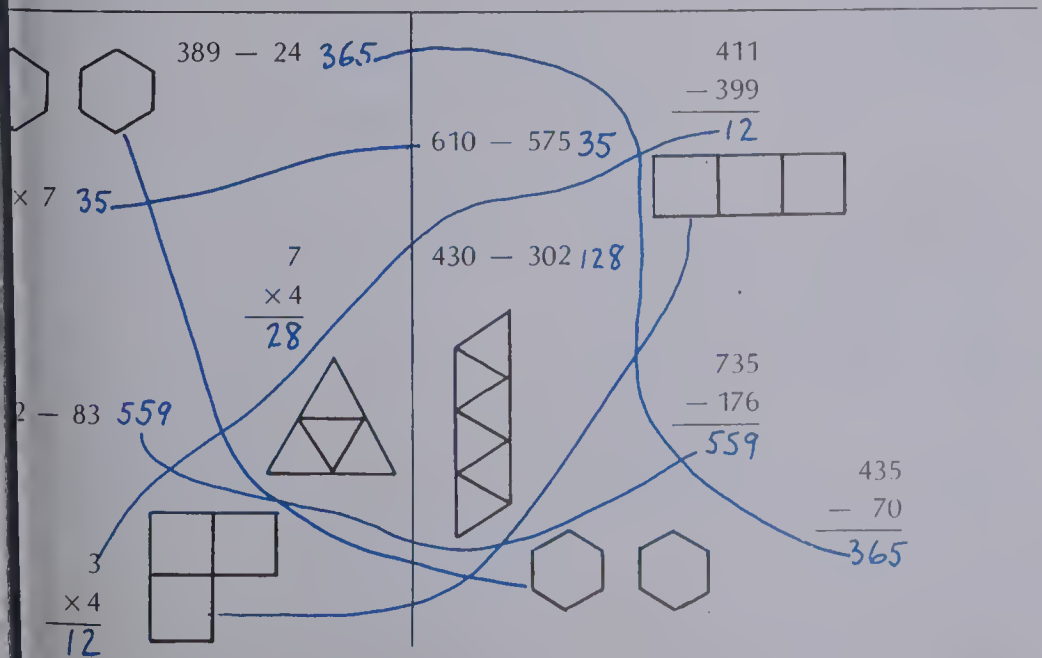
Strategies for investigating such equations may include *guess and test* and *inverse operations*.

## Extra Practice

Match the numbers or objects that are equal in amount.

## Worksheet G2

Pages 188-189



Items to be matched:

- Two identical hexagons.
- $389 - 24$  (result 365)
- $610 - 575$  (result 35)
- $430 - 302$  (result 128)
- $7 \times 4$  (result 28)
- $2 - 83$  (result 559)
- $3 \times 4$  (result 12)
- A large triangle composed of four smaller triangles.
- A vertical rectangle composed of four smaller triangles.
- Two identical hexagons.
- $411 - 399$  (result 12)
- $735 - 176$  (result 559)
- $435 - 70$  (result 365)

Connections made (indicated by blue lines):

- Two identical hexagons are connected to each other.
- $389 - 24$  is connected to 365.
- $610 - 575$  is connected to 35.
- $430 - 302$  is connected to 128.
- $7 \times 4$  is connected to 28.
- $2 - 83$  is connected to 559.
- $3 \times 4$  is connected to 12.
- The large triangle is connected to the vertical rectangle.
- Two identical hexagons are connected to each other.
- $411 - 399$  is connected to 12.
- $735 - 176$  is connected to 559.
- $435 - 70$  is connected to 365.

## Objective A44

Subtract 3-digit numerals with zero tens in the minuend.

## Introducing the Lesson

The province of Ontario has many important manufacturing industries. These industries employ thousands of workers.

Use the example on page 190 to introduce a method for working with "zero difficulties" in subtraction. Demonstrate with place-value materials that 5 hundred equals 50 tens. Illustrate and discuss each step as you carefully read through the example.

## Teaching the Lesson

Complete these equations.

8 hundreds = ■ tens

6 hundreds = ■ tens

2 hundreds = ■ tens

1 hundred = ■ tens

Practise subtracting one from multiples of ten.

20 - 1    60 - 1    90 - 1    10 - 1    50 - 1

When the tens place contains a zero, trade 1 ten for 10 ones as shown.

$$\begin{array}{r} 19\ 17 \\ -20\ 11 \\ \hline \end{array}$$

$$\begin{array}{r} 69\ 12 \\ -70\ 02 \\ \hline \end{array}$$

$$\begin{array}{r} \blacksquare\ \blacksquare \\ -50\ 00 \\ \hline \end{array}$$

$$\begin{array}{r} \blacksquare\ \blacksquare \\ -40\ 00 \\ \hline \end{array}$$

Subtract. If necessary use number blocks to demonstrate.

$$\begin{array}{r} 207 \\ -129 \\ \hline \end{array}$$

$$\begin{array}{r} 702 \\ -254 \\ \hline \end{array}$$

$$\begin{array}{r} 501 \\ -74 \\ \hline \end{array}$$

$$\begin{array}{r} 400 \\ -136 \\ \hline \end{array}$$

Remind the students that a difference is found by subtracting.

Some students would benefit from using a subtraction grid when completing the exercises.

Students should manipulate number blocks themselves to illustrate the regrouping.

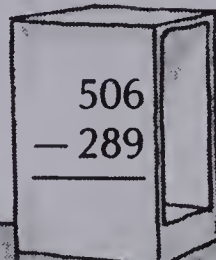
# Subtraction with 0 Tens

506 = 5 hundreds 0 tens 6 ones

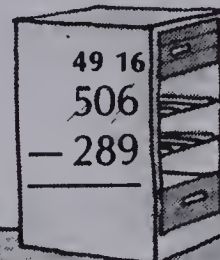
506 = 50 tens 6 ones



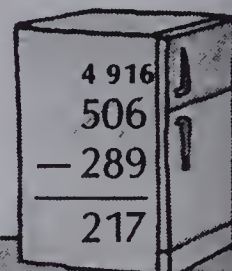
Trade? *yes*  
0 Tens!



One less than  
50 is 49.



Subtract.



## EXERCISES

Trade 1 ten for 10 ones.

- |   |   |   |   |  |
|---|---|---|---|--|
| 1. $\begin{array}{r} 69\ 14 \\ -20\ 11 \\ \hline \end{array}$ | 2. $\begin{array}{r} 59\ 12 \\ -20\ 02 \\ \hline \end{array}$ | 3. $\begin{array}{r} 49\ 18 \\ -20\ 08 \\ \hline \end{array}$ | 4. $\begin{array}{r} 79\ 11 \\ -20\ 01 \\ \hline \end{array}$ | 5. $\begin{array}{r} 89\ 10 \\ -20\ 00 \\ \hline \end{array}$  |
| 6. $\begin{array}{r} 19\ 13 \\ -20\ 03 \\ \hline \end{array}$ | 7. $\begin{array}{r} 29\ 15 \\ -20\ 05 \\ \hline \end{array}$ | 8. $\begin{array}{r} 89\ 17 \\ -20\ 07 \\ \hline \end{array}$ | 9. $\begin{array}{r} 29\ 10 \\ -20\ 00 \\ \hline \end{array}$ | 10. $\begin{array}{r} 59\ 10 \\ -20\ 00 \\ \hline \end{array}$ |

Subtract.

- |  |  |   |  |  |
|--|--|---|--|--|
| 11. $\begin{array}{r} 704 \\ -238 \\ \hline 466 \end{array}$ | 12. $\begin{array}{r} 602 \\ -317 \\ \hline 285 \end{array}$ | 13. $\begin{array}{r} 508 \\ -409 \\ \hline 99 \end{array}$ | 14. $\begin{array}{r} 801 \\ -792 \\ \hline 9 \end{array}$   | 15. $\begin{array}{r} 900 \\ -306 \\ \hline 594 \end{array}$ |
| 16. $\begin{array}{r} 203 \\ -35 \\ \hline 168 \end{array}$  | 17. $\begin{array}{r} 600 \\ -254 \\ \hline 346 \end{array}$ | 18. $\begin{array}{r} 300 \\ -35 \\ \hline 265 \end{array}$ | 19. $\begin{array}{r} 907 \\ -560 \\ \hline 347 \end{array}$ | 20. $\begin{array}{r} 305 \\ -123 \\ \hline 182 \end{array}$ |

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## Using the Exercises

- Questions 1 to 10 require trading with zero in the tens place.
- Questions 11 to 20 are subtraction problems involving zero tens in the minuend.



## PRACTICE

Subtract.

1.  $\begin{array}{r} 305 \\ - 138 \\ \hline 167 \end{array}$
2.  $\begin{array}{r} 570 \\ - 429 \\ \hline 141 \end{array}$
3.  $\begin{array}{r} 702 \\ - 501 \\ \hline 201 \end{array}$
4.  $\begin{array}{r} 204 \\ - 38 \\ \hline 166 \end{array}$
5.  $\begin{array}{r} 400 \\ - 225 \\ \hline 175 \end{array}$
6.  $\begin{array}{r} 730 \\ - 56 \\ \hline 674 \end{array}$
7.  $\begin{array}{r} 340 \\ - 27 \\ \hline 313 \end{array}$
8.  $\begin{array}{r} 602 \\ - 61 \\ \hline 541 \end{array}$
9.  $\begin{array}{r} 405 \\ - 9 \\ \hline 396 \end{array}$
10.  $\begin{array}{r} 304 \\ - 95 \\ \hline 209 \end{array}$
11.  $\begin{array}{r} 902 \\ - 217 \\ \hline 685 \end{array}$
12.  $\begin{array}{r} 205 \\ - 45 \\ \hline 160 \end{array}$
13.  $\begin{array}{r} 720 \\ - 606 \\ \hline 114 \end{array}$
14.  $\begin{array}{r} 110 \\ - 45 \\ \hline 65 \end{array}$
15.  $\begin{array}{r} 106 \\ - 97 \\ \hline 9 \end{array}$

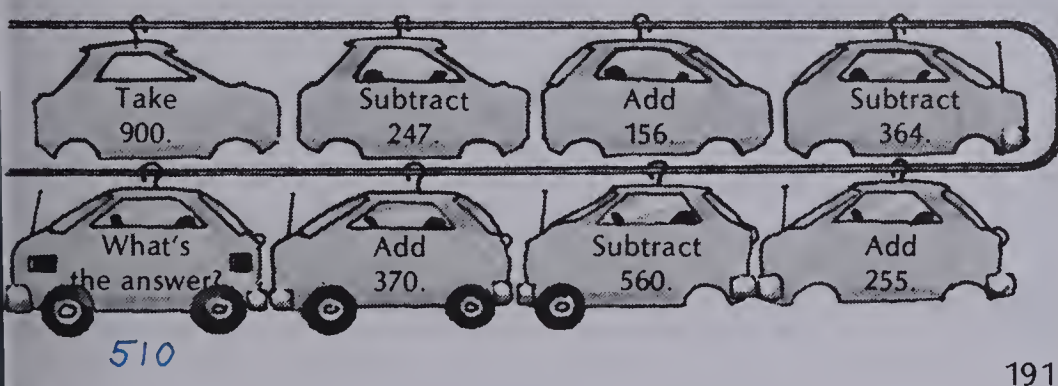
Find the difference.

16. 940 and 935 5
17. 407 and 808 401
18. 148 and 307 159
19. 700 and 264 436
20. 210 and 92 118
21. 406 and 513 107
22. 608 and 34 574
23. 634 and 950 316
24. 805 and 69 736
25. 221 and 40 181
26. 129 and 304 175
27. 870 and 999 129

Solve.

28. 270 cars on Monday. 193 on Tuesday.  
By how much do they differ? 77

## Move along the Line



## Extra Practice

Subtract.

Find the name of a city, unscramble the letters used.

- 402  $\begin{array}{r} 402 \\ - 164 \\ \hline 238 \end{array}$
- 301  $\begin{array}{r} 301 \\ - 287 \\ \hline 14 \end{array}$  N
- 609  $\begin{array}{r} 609 \\ - 80 \\ \hline 529 \end{array}$  R
- 106  $\begin{array}{r} 106 \\ - 59 \\ \hline 47 \end{array}$  O
- 500  $\begin{array}{r} 500 \\ - 56 \\ \hline 444 \end{array}$
- 100  $\begin{array}{r} 100 \\ - 21 \\ \hline 79 \end{array}$
- 700  $\begin{array}{r} 700 \\ - 640 \\ \hline 60 \end{array}$
- 200  $\begin{array}{r} 200 \\ - 43 \\ \hline 157 \end{array}$  O
- 308  $\begin{array}{r} 308 \\ - 109 \\ \hline 199 \end{array}$  T
- 702  $\begin{array}{r} 702 \\ - 387 \\ \hline 315 \end{array}$
- 428  $\begin{array}{r} 428 \\ - 209 \\ \hline 219 \end{array}$  O
- 606  $\begin{array}{r} 606 \\ - 207 \\ \hline 399 \end{array}$  T

W	248	D	443
O	157	R	529
T	399	O	47
I	148	A	59
N	14	T	199
S	434	O	219

City: TORONTO

## Assigning the Practice

Minimum: 1-20

Average: 1-28

Enriched: 1-28

## Reinforcement

1. Assign *Move along the Line* at the bottom of page 191. Discuss classroom ideas for extending the activity.

2. Sometimes it is useful to focus on place-value trading in isolation from its particular use in addition and subtraction. To do this, provide work cards showing cued numbers for trading practice.

$\begin{array}{r} 463 \\ - 824 \\ \hline \end{array}$	$\begin{array}{r} 824 \\ - 738 \\ \hline \end{array}$	$\begin{array}{r} 738 \\ - 261 \\ \hline \end{array}$	$\begin{array}{r} 261 \\ - 835 \\ \hline \end{array}$	$\begin{array}{r} 835 \\ - 486 \\ \hline \end{array}$
$\begin{array}{r} 486 \\ - 304 \\ \hline \end{array}$	$\begin{array}{r} 304 \\ - 732 \\ \hline \end{array}$	$\begin{array}{r} 732 \\ - 801 \\ \hline \end{array}$	$\begin{array}{r} 801 \\ - 640 \\ \hline \end{array}$	$\begin{array}{r} 640 \\ - 486 \\ \hline \end{array}$

3. Set up a mock assembly line for practising subtraction. Establish five to ten stations connected in order with bright pieces of yarn. Students, beginning with a large standardized outline of a truck, complete subtraction worksheets (shaped like simple pieces of the truck), and glue them onto the outline of the vehicle. Before moving on, the work should be "inspected". By the last station, the subtraction truck should be complete.



## Enrichment

Have the students explain why each subtraction method works.

- $\begin{array}{r} 503 \\ - 268 \\ \hline \end{array} \rightarrow \begin{array}{r} 499 \\ - 264 \\ \hline 235 \end{array}$
- $\begin{array}{r} 503 \\ - 268 \\ \hline \end{array} \rightarrow \begin{array}{r} 509 \\ - 274 \\ \hline 235 \end{array}$
- $\begin{array}{r} 503 \\ - 268 \\ \hline \end{array} \rightarrow \begin{array}{r} 505 \\ - 270 \\ \hline 235 \end{array}$
- $\begin{array}{r} 503 \\ - 268 \\ \hline \end{array} \rightarrow \begin{array}{r} 535 \\ - 300 \\ \hline 235 \end{array}$

## Objective M14

Subtract money amounts to \$9.99.

### Introducing the Lesson

Demonstrate the following subtraction problem on a grid using one dollar bills, dimes, and pennies. Have the students recall how to display \$3.34 and how to trade 1 dime for 10 pennies, and 1 dollar for 10 dimes.

**a.**

$$\begin{array}{r} \$3.34 \\ - 1.47 \\ \hline \end{array}$$

**b.**

$$\begin{array}{r} \$3.34 \\ - 1.47 \\ \hline \end{array}$$

**c.**

$$\begin{array}{r} \$3.34 \\ - 1.47 \\ \hline 7 \end{array}$$

**d.**

$$\begin{array}{r} \$3.34 \\ - 1.47 \\ \hline \$1.87 \end{array}$$

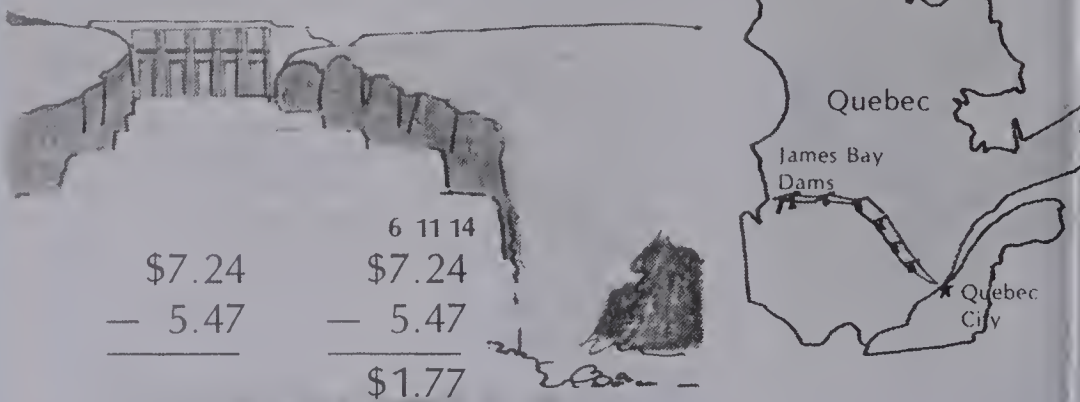
### Teaching the Lesson

Review printing money amounts using the dollar sign (\$) and decimal point (.). Relate the place values to one dollar bills, dimes, and pennies; and also to dollars and cents. Practise reading and writing different amounts.

Show the students how to align money amounts by relating this procedure to whole number alignment. Explain that a \$ is needed for the minuend (the top amount) and for the difference, but not for the subtrahend (the amount being subtracted). This makes the work appear neater.

\$4.52	\$7.49	\$3.04	\$5.33
1.46	0.83	1.68	0.77
\$	\$	\$	\$

## Dollar Differences



### EXERCISES

Subtract.

1. $\begin{array}{r} \$7.24 \\ - 3.02 \\ \hline \$4.22 \end{array}$	2. $\begin{array}{r} \$6.45 \\ - 4.25 \\ \hline \$2.20 \end{array}$	3. $\begin{array}{r} \$7.89 \\ - 6.38 \\ \hline \$1.51 \end{array}$	4. $\begin{array}{r} \$2.56 \\ - 0.23 \\ \hline \$2.33 \end{array}$
5. $\begin{array}{r} \$7.24 \\ - 3.05 \\ \hline \$4.19 \end{array}$	6. $\begin{array}{r} \$6.45 \\ - 4.28 \\ \hline \$2.17 \end{array}$	7. $\begin{array}{r} \$7.85 \\ - 6.38 \\ \hline \$1.47 \end{array}$	8. $\begin{array}{r} \$2.56 \\ - 0.27 \\ \hline \$2.29 \end{array}$
9. $\begin{array}{r} \$7.24 \\ - 3.32 \\ \hline \$3.92 \end{array}$	10. $\begin{array}{r} \$6.45 \\ - 4.65 \\ \hline \$1.80 \end{array}$	11. $\begin{array}{r} \$7.89 \\ - 6.98 \\ \hline \$0.91 \end{array}$	12. $\begin{array}{r} \$2.56 \\ - 0.73 \\ \hline \$1.83 \end{array}$
13. $\begin{array}{r} \$7.24 \\ - 3.35 \\ \hline \$3.89 \end{array}$	14. $\begin{array}{r} \$6.45 \\ - 4.68 \\ \hline \$1.77 \end{array}$	15. $\begin{array}{r} \$7.85 \\ - 6.98 \\ \hline \$0.87 \end{array}$	16. $\begin{array}{r} \$2.56 \\ - 0.77 \\ \hline \$1.79 \end{array}$
17. $\begin{array}{r} \$7.04 \\ - 3.35 \\ \hline \$3.69 \end{array}$	18. $\begin{array}{r} \$6.05 \\ - 4.68 \\ \hline \$1.37 \end{array}$	19. $\begin{array}{r} \$7.05 \\ - 6.98 \\ \hline \$0.07 \end{array}$	20. $\begin{array}{r} \$2.06 \\ - 0.77 \\ \hline \$1.29 \end{array}$

### Using the Exercises

- Questions 1 to 4 involve subtraction of money amounts. The students are aided in printing the money difference.
- Questions 5 to 20 involve subtraction of money amounts.



## PRACTICE

Find the difference.

1. \$7.35 and \$4.62 **\$2.73**
2. \$3.25 and \$7.75 **\$4.50**
3. \$9.63 and \$7.59 **\$2.04**
4. \$2.66 and \$4.00 **\$1.34**
5. \$3.07 and \$6.70 **\$3.63**
6. \$5.04 and \$0.75 **\$4.29**
7. \$8.21 and \$9.57 **\$1.36**
8. \$9.00 and \$5.32 **\$3.68**
9. \$7.44 and \$3.80 **\$3.64**
10. \$6.23 and \$2.77 **\$3.46**

Solve.

11. Paul has \$6.42. Charles has \$5.77. **Paul \$0.65**  
Who has more? How much more?
12. Hélène made \$4.07. Jean made \$1.29. **Jean \$2.78**  
Who made less? How much less?
13. Roger spent \$3.07. André spent \$7.00. **André \$3.93**  
Who spent more? How much more?
14. Marie saved \$3.52. Gisele saved \$6.70. **Marie \$3.18**  
Who saved less? How much less?

## Dairy Products

Give the missing factors.

1.  $3 \times \blacksquare = 21$
2.  $7 \times \blacksquare = 35$
3.  $2 \times \blacksquare = 18$
4.  $4 \times \blacksquare = 32$
5.  $\blacksquare \times \blacksquare = 14$
6.  $\blacksquare \times \blacksquare = 25$
7.  $\blacksquare \times \blacksquare = 12$  and  $\blacksquare \times \blacksquare = 12$
8.  $\blacksquare \times \blacksquare = 24$  and  $\blacksquare \times \blacksquare = 24$



193

## Assigning the Practice

Minimum: 1-10

Average: 1-14

Enriched: 1-14

## Reinforcement

1. Review several multiplication facts. Point out the **factors** and the **products**. Assign *Dairy Products* at the bottom of page 193.

2. Decorate a small wall space to look like the dairy section in a grocery store. Display pictures of a variety of dairy products complete with price tags: milk in several sizes of cartons, butter, cream, cottage cheese, a variety of cheeses, yogurt, sour cream, powdered milk, etc. Provide two kinds of work cards: *grocery money* and *milk products*. Upon choosing one each at random, the student must determine the amount of change.

Grocery Money  
You have \$4.20.

Milk Products  
You buy butter and cottage cheese.

## Enrichment

1. If you have not done so as yet, establish a play store. See Unit 9 for a variety of ideas related to money.

2. Compare the two most common ways of making change.

a. Count from the purchase price to the amount paid using progressively larger coins and bills.

b. Subtract the purchase price from the amount paid. Then count out the difference using progressively smaller coins and bills.

## Extra Practice

## Worksheet M14

Pages 192-193

tract.

Find the name of a city, unscramble the letters used.

- |                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|
| \$6.35          | \$4.32          | \$3.28          | \$7.42          |
| 0.48            | — 0.65          | — 2.84          | — 7.00          |
| <b>\$5.87 E</b> | <b>\$3.67</b>   | <b>\$0.44</b>   | <b>\$0.42 T</b> |
| 8.00            | \$4.02          | \$5.25          | \$6.00          |
| 3.27            | — 1.06          | — 1.75          | — 1.24          |
| <b>\$4.73 L</b> | <b>\$2.96 A</b> | <b>\$3.50 O</b> | <b>\$4.76 N</b> |
| 1.38            | \$2.60          | \$4.04          | \$8.69          |
| 1.19            | — 0.70          | — 3.45          | — 0.89          |
| <b>\$0.19</b>   | <b>\$1.90</b>   | <b>\$0.59 R</b> | <b>\$7.80 M</b> |

Q	\$6.87	A	\$2.96
B	\$0.34	C	\$3.96
T	\$0.42	O	\$3.50
R	\$0.59	L	\$4.73
E	\$5.87	N	\$4.76
U	\$1.80	M	\$7.80

City: **MONTREAL**

# UNIT 10 LESSON 7

## Objective PS17

Solve two-step word problems involving addition and subtraction.

## Introducing the Lesson

Show the students how to act out or model a problem situation. Require that all steps of the solution be included.

165 fish in one net  
382 in the second  
96 of them slip away.  
How many remain?  
451 fish are left in the nets.

$$\begin{array}{r} 165 \\ +382 \\ \hline 547 \\ -96 \\ \hline 451 \end{array}$$

Have the students suggest different versions of the word problem:

- requiring two additions,
- requiring a subtraction and then an addition,
- requiring two subtractions.

## Teaching the Lesson

Discover with the students how to use addition and subtraction to ensure each row and each column have the same sum.

		4	9	6	5
2		8			9
7	3		5	6	7

## Enrichment

- Investigate ways to add and subtract the numbers 5, 7, and 9 in two steps. Express the examples as two-step problems and as expressions. Two of the ten solutions are:

$$\begin{array}{r} 7 \\ +9 \\ \hline 16 \end{array} \quad \begin{array}{r} 16 \\ -5 \\ \hline 11 \end{array} \quad \text{for } (7 + 9) - 5$$

$$\begin{array}{r} 5 \\ +7 \\ \hline 12 \end{array} \quad \begin{array}{r} 12 \\ +9 \\ \hline 21 \end{array} \quad \text{for } (5 + 7) + 9$$

- Locate the Maritime Provinces and their capitals. After discussing the importance of fishing, farming, and forestry in the region, ask the students to compose two-step word problems referring to these industries (as shown on page 194).

## Two StepPS

Show both steps.

- 45 boats out fishing  
19 return to Halifax.  
25 return to St. John's.  
How many still fishing? **1**

- 354 potatoes in a garden  
446 in another  
235 are dug up.  
How many are left? **565**

- 231 trees cut for lumber  
129 cut for paper  
98 for plywood  
How many cut in all? **458**

- An airplane is flying at 950 metres.  
Mt. Carleton is 820 metres tall.  
You are 50 metres from the top.  
How far are you from the airplane? **180m**



Each row and each column must have the same sum.

5.

8	9	7
8	9	7
8	6	10
3		
5		

6.

37	45	28
9		
19	34	57
16		
28	28	53

7.

345	156	297
	47	
	62	
	110	
169	10	539

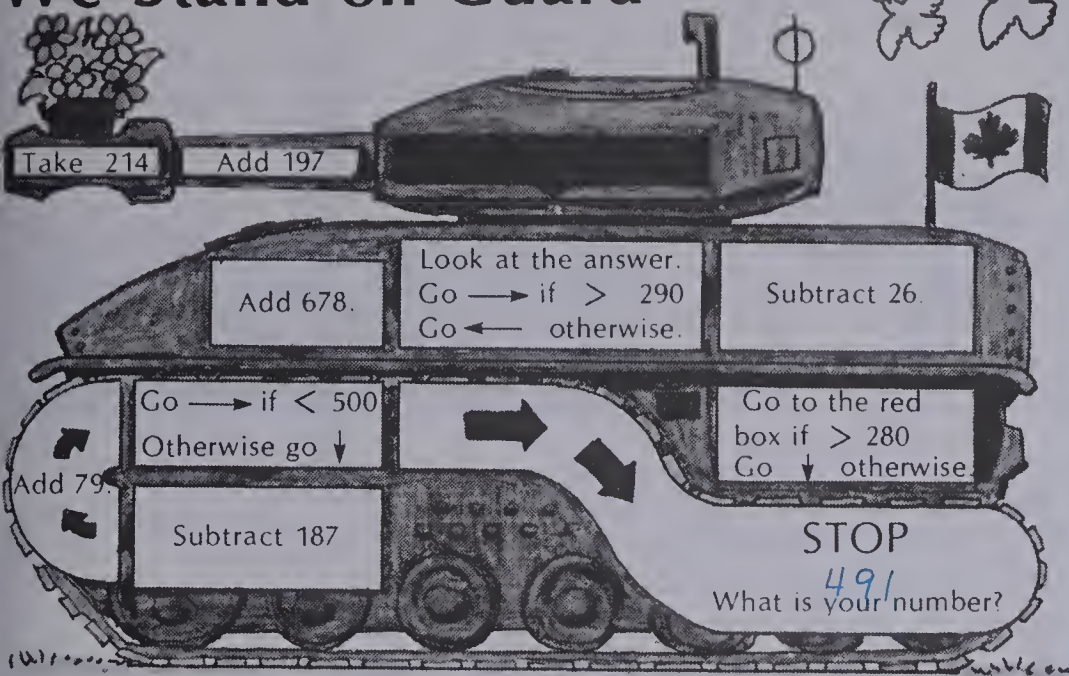
194

## Problem Solving Activities

Assign Level 3, Unit 10.



# We Stand on Guard



Follow the path above.

It will have you do the problems below in a different order.

Can you do them in the order that the path says?

A. $\begin{array}{r} 214 \\ + 197 \\ \hline 411 \end{array}$	B. $\begin{array}{r} 736 \\ + 79 \\ \hline 815 \end{array}$	C. $\begin{array}{r} 245 \\ + 678 \\ \hline 923 \end{array}$	D. $\begin{array}{r} 373 \\ - 26 \\ \hline 347 \end{array}$	E. $\begin{array}{r} 628 \\ + 79 \\ \hline 707 \end{array}$
F. $\begin{array}{r} 347 \\ - 38 \\ \hline 309 \end{array}$	G. $\begin{array}{r} 520 \\ + 79 \\ \hline 599 \end{array}$	H. $\begin{array}{r} 411 \\ - 38 \\ \hline 373 \end{array}$	I. $\begin{array}{r} 412 \\ + 79 \\ \hline 491 \end{array}$	J. $\begin{array}{r} 923 \\ - 187 \\ \hline 736 \end{array}$
K. $\begin{array}{r} 707 \\ - 187 \\ \hline 520 \end{array}$	L. $\begin{array}{r} 283 \\ - 38 \\ \hline 245 \end{array}$	M. $\begin{array}{r} 599 \\ - 187 \\ \hline 412 \end{array}$	N. $\begin{array}{r} 815 \\ - 187 \\ \hline 628 \end{array}$	O. $\begin{array}{r} 309 \\ - 26 \\ \hline 283 \end{array}$

195

## Extra Practice

## Worksheet PS17-PS18

Pages 194-195

Make each row and column have the same sum.

30	32		36	12	17	83	
21	35	44	26	62	12	45	
49	24		19	40	41	17	39

## Objective PS18

Follow a flow chart.

## Introducing the Lesson

A flow chart is a path with instructions. The arithmetic flow chart on page 195 involves branching (choosing one of two directions on a path) and looping (repeating part of a path).

The flow chart on page 195 is suitable for enrichment. The subtraction problems A to O may be assigned to less capable students without reference to the arithmetic flow chart.

## Teaching the Lesson

Have available a sturdy game board consisting of an enlarged version of the flow chart in the pupils' books. This lesson requires careful and active simulation.

Review the meaning of  $<$  and  $>$ . Determine which statements are true.

$235 < 321$  |  $145 > 136$  |  $92 < 96$  |  $407 > 509$

Use simple comparisons to practise movement decisions.

a. Those taller than this mark, sit down. Otherwise, stay standing.

b. Move to the left if you are 9 or older. Move to the right if you are less than 9.

c. Nod if you have more than 4 in your family. Otherwise, put your hands on your head.

On the flow chart game board, position a **TAKE 210** card over the box **Take 214**. (The flow chart generates a different sequence of problems whenever its first entry is changed.) Use a token to keep track of the position on the flow chart while demonstrating its use. Carefully record each problem. Starting with 210 the record should read:

$\begin{array}{r} 210 \\ + 197 \\ \hline 407 \end{array}$	$\begin{array}{r} 407 \\ - 38 \\ \hline 369 \end{array}$	$\begin{array}{r} 369 \\ - 26 \\ \hline 343 \end{array}$
$\begin{array}{r} 343 \\ - 38 \\ \hline 305 \end{array}$	$\begin{array}{r} 305 \\ - 26 \\ \hline 279 \end{array}$	STOP

To use the flow chart on page 195, organize the students into pairs.

**Objective G3**

Identify and investigate symmetric figures.

**Introducing the Lesson**

Fold several pieces of construction paper in half. As if by magic, quickly cut out and display symmetric figures.

**Teaching the Lesson**

Ask the students to describe the paper cutouts. Lead the students to identify these properties.

- The fold separates the figures into two *equal* portions.
- When folded together, the equal portions match.

Explain that a figure is called **symmetric** if it can be folded so that equal parts of it match. Explain that the fold line is called the *line of symmetry*.

Not all figures have just one line of symmetry; figures may have zero, one, two, or more lines of symmetry. Use construction paper models to discuss examples.

- Not symmetric



can be cut into two equal parts, but they do not match when folded together.

- Symmetric



has two different lines of symmetry.

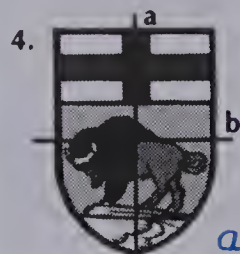
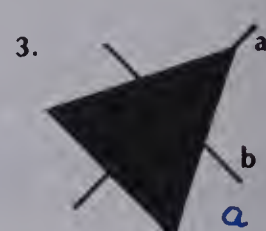
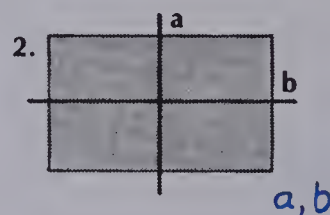
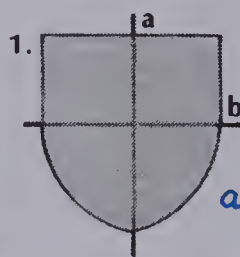
Read the explanation on page 196. The Canadian flag and Parliament Buildings (like many flags, crests, and buildings) are symmetric.

**Symmetry**

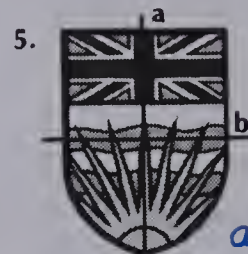
Each line above cuts a picture into equal parts. If you folded along the line, the parts would match. This kind of line is called a **line of symmetry**.

**EXERCISES**

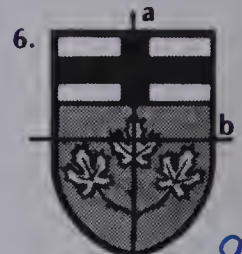
Record each line of symmetry. (Like this: 7. none 8. a, b)



Manitoba



British Columbia



Ontario

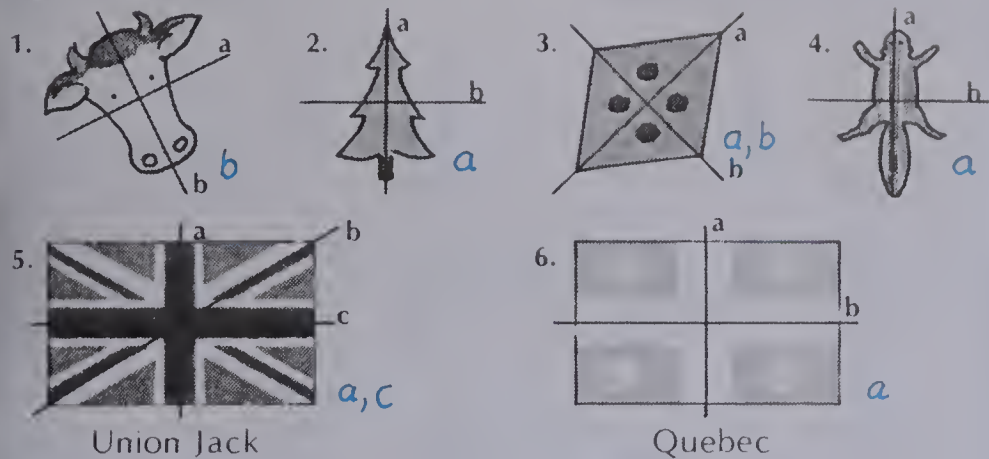
**Using the Exercises**

- Questions 1 to 6 require identifying lines of symmetry.



## PRACTICE

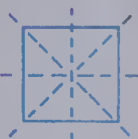
Record each line of symmetry



Union Jack

Quebec

7. Draw a square 6 cm wide. Find 4 lines of symmetry.



8. Draw a rectangle 3 cm wide and 5 cm long. Show its lines of symmetry.



9. Fold a piece of paper. Then cut out shapes like these.



## REVIEW

Find the difference.

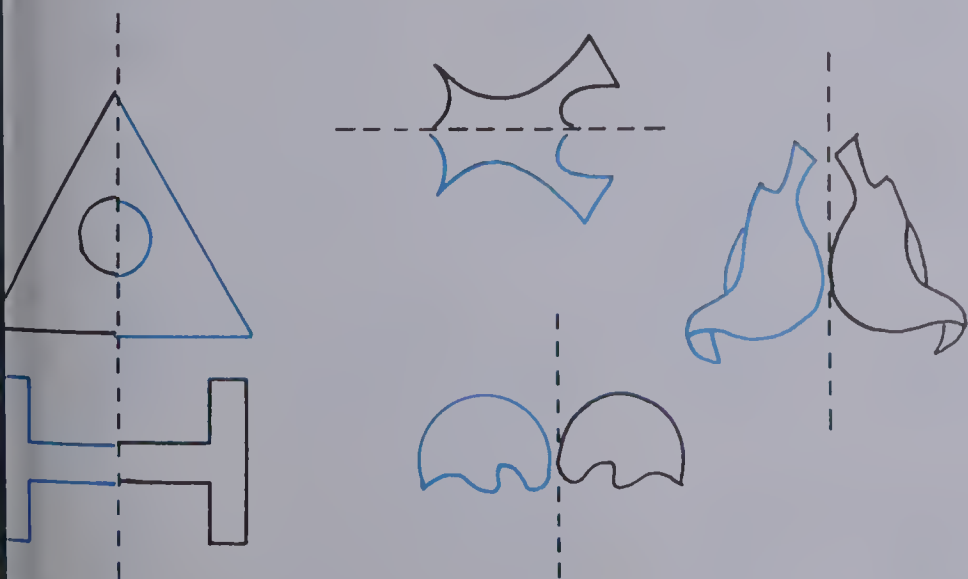
1. 302 - 175 ----- 127	2. 207 - 138 ----- 69	3. 703 - 68 ----- 635	4. 604 - 53 ----- 551	5. 500 - 45 ----- 455
---------------------------------	--------------------------------	--------------------------------	--------------------------------	--------------------------------

6. \$6.35 and \$7.20 \$0.85	7. \$7.05 and \$2.98 \$4.07
8. \$4.56 and \$8.95 \$4.39	9. \$3.21 and \$8.00 \$4.79

197

## Extra Practice

Complete the figure so that it is symmetric.



## Worksheet G3

Pages 196-197

## Assigning the Practice

Minimum: 1-4, 9

Average: 1-9

Enriched: 1-9

## Review Exercises

Questions	Objective	Pages
1-5	A44	190-191
6-9	M14	192-193

## Reinforcement

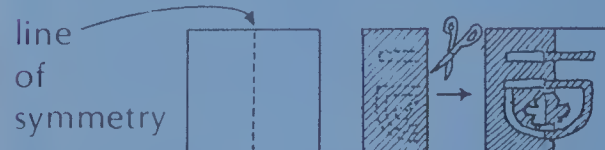
1. Flat mirrors are very useful for investigating the symmetry of designs and pictures. Gather several mirrors, magazine pictures, designs, etc. Have students prepare a small booklet to report on their findings.

2. Request a Mirror Card kit from your school or district resource centre. The E.S.S. science/math kit contains a large variety of work cards carefully organized in sequence.

3. Prepare a large number of construction paper figures. Ask a small group to sort the figures into 4 categories: *not symmetric*, *1 line of symmetry*, *2 lines of symmetry*, *more than 2 lines of symmetry*.

## Enrichment

1. Students can design their own symmetric flags and crests using the art concept of positive/negative. Two rectangles of complementary colour are needed, one exactly half the area of the other.



2. Challenge the students to construct the 16 symmetric letters using construction paper rectangles (approximately 7 cm by 10 cm) and scissors. Display the best efforts on the bulletin board.



3. Students can list symmetric objects discovered in the classroom. Help the students set a goal for themselves.

Unit 10 Objectives	Test Questions	Pages
A41	1-5	182-183
A42	6-10	184-185
A43	11-15	186-187
A44	16-22	190-191
M14	23-26	192-193
PS17	27	

TEST

UNIT 10

Subtract.

1. 345  
- 119  
-----  
226

2. 621  
- 516  
-----  
105

3. 890  
- 807  
-----  
83

4. 654  
- 503  
-----  
151

5. 987  
- 9  
-----  
978
6. 642  
- 360  
-----  
282

7. 835  
- 275  
-----  
560

8. 206  
- 184  
-----  
22

9. 444  
- 73  
-----  
371

10. 283  
- 90  
-----  
193
11. 634  
- 287  
-----  
347

12. 222  
- 135  
-----  
87

13. 856  
- 487  
-----  
369

14. 483  
- 97  
-----  
386

15. 710  
- 29  
-----  
681
16. 302  
- 167  
-----  
135

17. 806  
- 758  
-----  
48

18. 507  
- 282  
-----  
225

19. 700  
- 278  
-----  
422

20. 200  
- 35  
-----  
165

Find the difference.

21. 335 and 911 576

22. 827 and 96 731
23. \$6.35 and \$3.59 \$2.76

24. \$0.76 and \$5.00 \$4.24
25. \$1.54 and \$6.29 \$4.75

26. \$2.47 and \$1.38 \$1.09

Solve. Show both steps.

27. 756 people live in a community.  
377 are children.  
195 are men.  
How many are women?

756  
- 377  
-----  
379

379  
- 195  
-----  
184 women
- 198
- Post-test
- Unit
- Subtract.
1. 491  
- 133  
-----  
358

2. 780  
- 425  
-----  
355

3. 562  
- 324  
-----  
238

4. 874  
- 639  
-----  
235

5. 753  
- 214  
-----  
539

6. 538  
- 65  
-----  
473

7. 627  
- 252  
-----  
375

8. 813  
- 391  
-----  
422

9. 768  
- 496  
-----  
272

10. 546  
- 283  
-----  
263

11. 726  
- 169  
-----  
557

12. 322  
- 287  
-----  
35

13. 541  
- 359  
-----  
182

14. 813  
- 524  
-----  
289

15. 646  
- 458  
-----  
188

16. 300  
- 136  
-----  
164

17. 204  
- 25  
-----  
179

18. 800  
- 651  
-----  
149

19. 602  
- 438  
-----  
164

20. 500  
- 224  
-----  
276
- 198



## ADDITION

Add.

1.  $\begin{array}{r} 7 \\ +5 \\ \hline 12 \end{array}$
2.  $\begin{array}{r} 3 \\ +8 \\ \hline 11 \end{array}$
3.  $\begin{array}{r} 6 \\ +9 \\ \hline 15 \end{array}$
4.  $\begin{array}{r} 40 \\ +5 \\ \hline 45 \end{array}$
5.  $\begin{array}{r} 6 \\ +20 \\ \hline 26 \end{array}$
6.  $\begin{array}{r} 65 \\ +18 \\ \hline 83 \end{array}$
7.  $\begin{array}{r} 37 \\ +29 \\ \hline 66 \end{array}$
8.  $\begin{array}{r} 856 \\ +142 \\ \hline 998 \end{array}$
9.  $\begin{array}{r} 135 \\ +245 \\ \hline 380 \end{array}$
10.  $\begin{array}{r} 564 \\ +217 \\ \hline 781 \end{array}$
11.  $\begin{array}{r} 63 \\ +62 \\ \hline 125 \end{array}$
12.  $\begin{array}{r} 80 \\ +90 \\ \hline 170 \end{array}$
13.  $\begin{array}{r} 145 \\ +582 \\ \hline 727 \end{array}$
14.  $\begin{array}{r} 240 \\ +365 \\ \hline 605 \end{array}$
15.  $\begin{array}{r} 573 \\ +43 \\ \hline 616 \end{array}$
16.  $\begin{array}{r} 76 \\ +77 \\ \hline 153 \end{array}$
17.  $\begin{array}{r} 29 \\ +71 \\ \hline 100 \end{array}$
18.  $\begin{array}{r} 368 \\ +586 \\ \hline 954 \end{array}$
19.  $\begin{array}{r} 468 \\ +468 \\ \hline 936 \end{array}$
20.  $\begin{array}{r} 242 \\ +58 \\ \hline 300 \end{array}$
21.  $\begin{array}{r} 7 \\ 8 \\ +5 \\ \hline 20 \end{array}$
22.  $\begin{array}{r} 38 \\ 43 \\ +25 \\ \hline 106 \end{array}$
23.  $\begin{array}{r} 65 \\ 39 \\ +49 \\ \hline 153 \end{array}$
24.  $\begin{array}{r} 183 \\ 281 \\ +364 \\ \hline 828 \end{array}$
25.  $\begin{array}{r} 439 \\ 239 \\ +238 \\ \hline 916 \end{array}$

Round to the nearest ten.

26. 36 40
27. 55 60
28. 97 100
29. 341 340

Estimate the sum.

30.  $32 + 49$  is about 80
31.  $199 + 402$  is about 600

Solve.

32. 14 dogs are in the ring with 12 clowns and 17 monkeys. How many animals are in the ring? 31

## Informal Assessment

1. Have the student perform these problems using place-value materials.

$$\begin{array}{r} 672 \\ -138 \\ \hline \end{array} \quad \begin{array}{r} 527 \\ -283 \\ \hline \end{array} \quad \begin{array}{r} 711 \\ -257 \\ \hline \end{array} \quad \begin{array}{r} 900 \\ -342 \\ \hline \end{array}$$

2. Have the students discuss these problems while completing them without place-value materials.

$$\begin{array}{r} 493 \\ -227 \\ \hline \end{array} \quad \begin{array}{r} 839 \\ -265 \\ \hline \end{array} \quad \begin{array}{r} 923 \\ -564 \\ \hline \end{array} \quad \begin{array}{r} 805 \\ -618 \\ \hline \end{array}$$

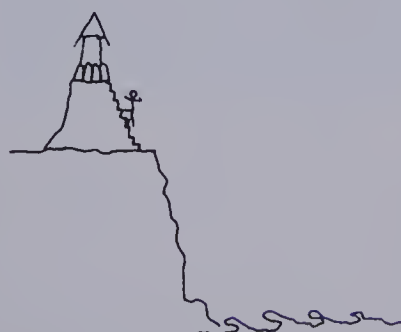
Find the difference.

1. 601 and 413 188
22. 82 and 541 459
3. \$7.84 and \$9.23 \$1.39
24. \$1.45 and \$0.99 \$0.46
5. \$4.32 and \$1.19 \$3.13
26. \$0.89 and \$1.12 \$0.23

Solve. Show both steps.

7. A cliff is 290 m above the water. A tower on the cliff is 35 m tall. Jim is 17 m below the tower's top. How far is Jim from the water?

308 m



# UNIT 11

## Geometry

Theme: Artwork

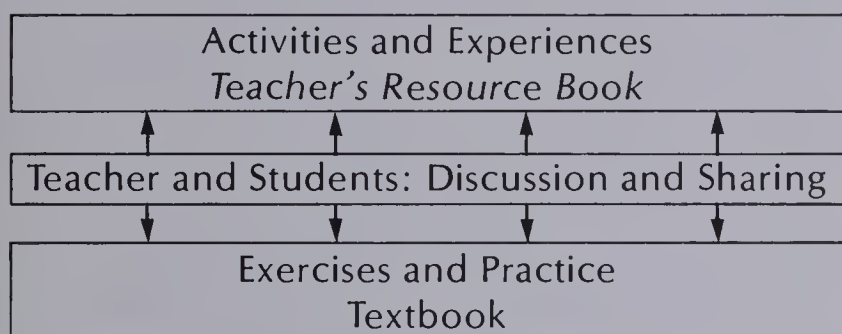
Lesson		Objective	Vocabulary	Materials
Preview		Review plane figures and symmetry.	circle, triangle, rectangle, square, line of symmetry	black felt board or construction paper, outlines of plane figures, rectangular paper
1	G4	Identify and investigate straight line segments and points.	point, straight line segment, intersection, endpoint	toothpicks
2	G5	Identify and construct common geometric solids.	cube, cone, sphere, cylinder, pyramid, prism	objects representing common geometric solids, clay, kitchen knives, newspaper, plastic wrap
3	G6	Identify and investigate the faces of common solids.	face	models of geometric solids
4	G7	Identify the edges and corners of common solids.	edge, corner	models of geometric solids, straws, Plasticene
5	G8	Identify similar and congruent figures.	same shape, same size	cardboard figures, (squares and triangles)
6	GR2	Use a number pair to name a location on a grid.	number pair	4 × 4 grids, labels
7	G9	Perform slides of figures on grids.	slide	4 × 4 grids, 6 × 6 grids, markers, cards
8	PS19	Sort and classify solids.	sort, list, report	models of solids
	PS20	Summarize information in a report.	report	
Test		Geometry		
Review		Problem solving		



# About This Unit

For young students, a full development of geometric concepts and skills can best be accomplished using an active, experiential approach. From a developmental viewpoint, the method of instruction can be as crucial as the specific geometry topics presented. Throughout this unit, students should be encouraged to make and construct, to experience and investigate, and to hypothesize and test.

The geometry program should be developed using a rich variety of activities stressing its intuitive and integrative aspects. Parallel to this, there should be a sequence of clearly defined presentations, developmental and practice exercises, and extensions. This dual design is one of the essential and distinguishing features of the geometry and measurement units of *Houghton Mifflin Mathematics*.



Ample time should be allotted for discussion and the sharing of experiences. This will provide an opportunity for more than summarizing and reviewing. Concept and language development can be achieved in tandem, special insights and relationships can be pursued, and the results of investigations and activities can be demonstrated.

The teaching of geometry requires common sense tempered with reasonable care. Teachers should keep in mind the following comments and suggestions when investigating and discussing the concepts and skills in this unit.

## Unit Preview

Plane figures and symmetry have been discussed in previous units, but they will need to be reviewed. The identification of basic figures and their properties should be reinforced by the construction of plane figures and symmetric figures by students. Examples may be derived

from designs and common objects. This unit contains about thirty ideas appropriate for activity work cards.

The following resources are recommended for use by students: *What is Symmetry?* Mindel Sitomer, Thomas Y. Crowell Company, 1970, *Mirror Cards* Elementary Science, and *Mira Math*.

## Lesson 1

The abstract concepts of point and segment will not be mastered by most students. Phrases such as “suggests a segment” (“reminds”, “represents”, “looks like”) should be used to refer to physical representations of a point or segment. Review that a point and a segment have no thickness.

## Lesson 2

Make certain that the students have sufficient practice associating common objects with the geometric solids. Using classroom models for construction of houses, castles, robots, and so on, is as valuable an activity as identifying solids by type. Until the faces themselves are analysed in the next lesson, some students may confuse pyramids, prisms, boxes, and cubes.

## Lesson 3

Strictly speaking, an object that looks like a solid, but is hollow, is called a **shell**. An obvious example that students can remember is the shell of an egg. A **net** is a plane figure that can be folded to form the shell of a solid. Investigations involving shells and nets are valuable activities for identifying the faces of solids. Several patterns are provided with this unit.

## Lesson 4

The **skeletons** of solids are not to be confused with the solids themselves. Through exploration, students may discover skeletons of solids other than those studied, such as the *tetrahedron* with 4 triangular sides (6 edges and 4 corners). The terminology of **vertex** and **vertices** is not used until Grade 4. Instead, the more vernacular term **corner** is introduced. Note that the “corner” of a cone is *not* the endpoint of an edge.

## Lesson 5

Some students may associate incorrectly **same shape** with the concept of congruence. Shape is an essential generic term. All squares have the same shape. They, however, may be of different size. They are **similar**. Figures must have *the same shape and the same size* to be **congruent**. In the exercises, congruent figures are translated (slid), rotated (turned), and reflected (flipped). Congruent figures are treated at the intuitive level in Lesson 4 of Unit 10 (Equal and Unequal) and in the Preview of this unit.

## Lesson 6

To introduce ideas of coordinate graphing in Grade 3, the cells of grids rather than intersection points are used. This introductory approach can be related to many real, physical situations that involve rows and columns: desks in a classroom, checker boards, bingo cards, egg cartons, regions on maps, etc.

## Lesson 7

In the treatment of congruence in Lesson 5, students worked informally with slides and turns. Lesson 7 contains a more formal, but practical, treatment of slides on grids. A comparable treatment of turns and flips is deferred until later grades.

## Lesson 8

The restricted format of a textbook limits sorting and classification activities. It is essential that students be given an opportunity to sort and classify a variety of materials possessing various distinguishing properties (shape, size, number of edges, colour, and so on).

# Ideas

The integrative theme of *Artwork* for Unit 11 was chosen to support an active, experiential approach to learning. The lessons in Unit 11 contain numerous suggestions for activities, games, and experiences. These notes are devoted to specific art projects and related environmental activities that introduce, reinforce, and supplement the ideas on the student pages.

The stages of the process that should evolve when geometry is combined with art are as follows:

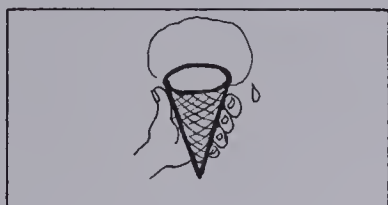
1. Students discuss and generate ideas that relate concepts and techniques from geometry and art.
2. A plan is devised as a guideline. The plan is not a rigid formula.
3. The plan is executed. Revisions and refinements are incorporated.
4. An artwork or craft project is displayed, discussed, and analysed.

The following geometric terms may be useful in your discussion of geometry and art.

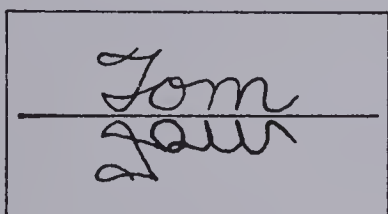
above	line of symmetry
angle	open figure
area	outside
asymmetry	parallel
below	parallelogram
beside	pentagon
boundary	perpendicular
circumference	plane
closed figure	point
concentric	polyhedron
cone	position
congruent figure	rectangular prism
corner	reduction
cube	right angle
curve	segment
cylinder	shell
diagonal	similar figure
diameter	skeleton
edge	slide
enlargement	solid
face	sphere
figure	spiral
flip	symmetry
flip line	surface
hexagon	triangle
horizontal	triangular prism
inside (interior)	turn
intersect	vertex
knots	vertical
length	



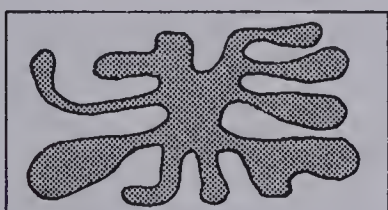
1. Two-dimensional models and designs may be constructed from coloured toothpicks, tongue depressors, ribbon, string, and straws. A geometric collage may feature similar shapes.
2. Provide the students with several plastic-covered drawing cards featuring single geometric figures. Challenge each student to expand the figure into a picture in a creative way.



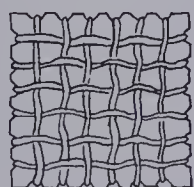
3. Pastels or chalk are suitable for mirror handwriting pictures. This project requires patience and planning from the students.



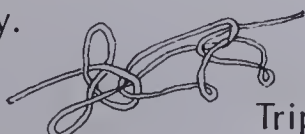
4. Inside and Outside Pictures require simple closed curves and two colours of paint. The effects can be quite attractive if care is taken to outline the boundary in black.



5. Introduce simple weaving on notched, square, cardboard frames. Changing colours results in interesting effects. Some repeated patterns may be achieved. Inherent in this project are the concepts of perpendicular and parallel lines.

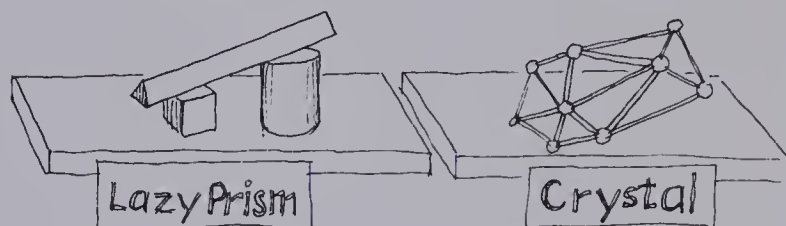


6. Ask your librarian for books and articles about tying knots. Tell your students that some mathematicians at universities study knots. Knot Theory really is a branch of geometry.

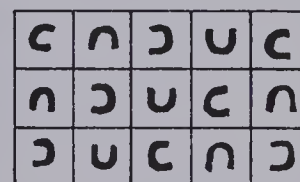


Triple tangled knot

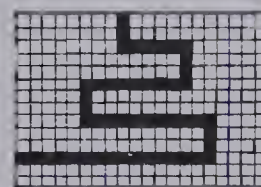
7. Create a sculpture shelf in the classroom. Quite interesting pieces can be made using wooden geometry blocks. Encourage the students to choose a title for their sculpture.



8. Three-dimensional art pieces can be made as skeletons using combinations of toothpicks, straws, pipe cleaners, and wooden dowels.
9. Printmaking is easy and educational. Employ either potato prints or Plasticene prints to create repeated patterns of congruent figures. As a variation, permit turns. (Flips cannot be accomplished using potatoes or Plasticene, but can be illustrated with tracing paper or onion skin paper.)



10. For larger grids, a sequence of number pairs can indicate a path that results in a grid design. Although this works best with grids involving intersection points, the same techniques can be applied to grids involving cells.

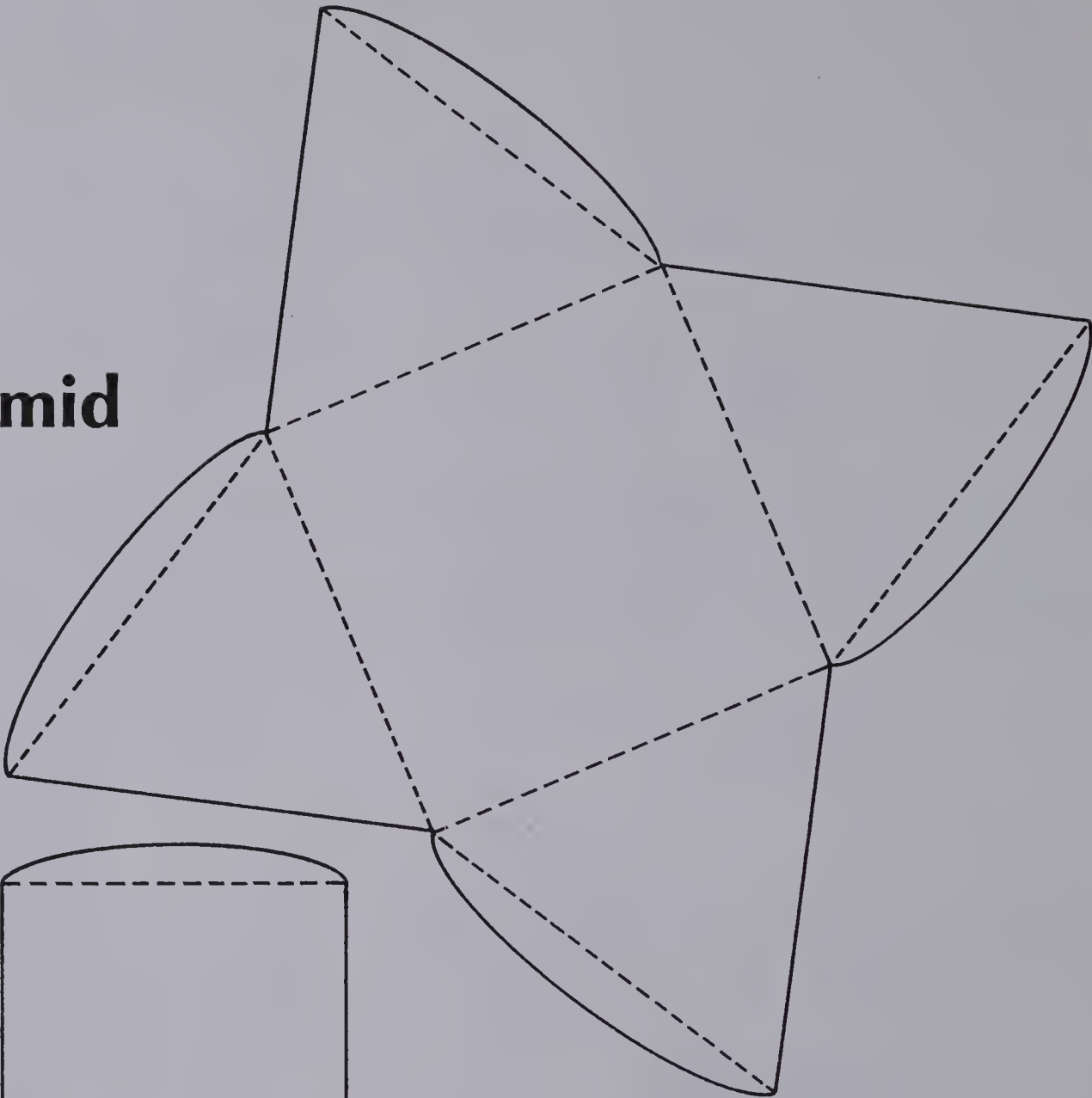


11. After assigning several challenging problems with mazes, ask the students to design their own mazes. Require them to use rulers for their drawings.
12. On clear acetate, prepare a grid with 1 cm<sup>2</sup> cells. Show students how to enlarge any picture in a book by using the small grid on the acetate sheet and a larger grid on paper. This project requires patience from the students.

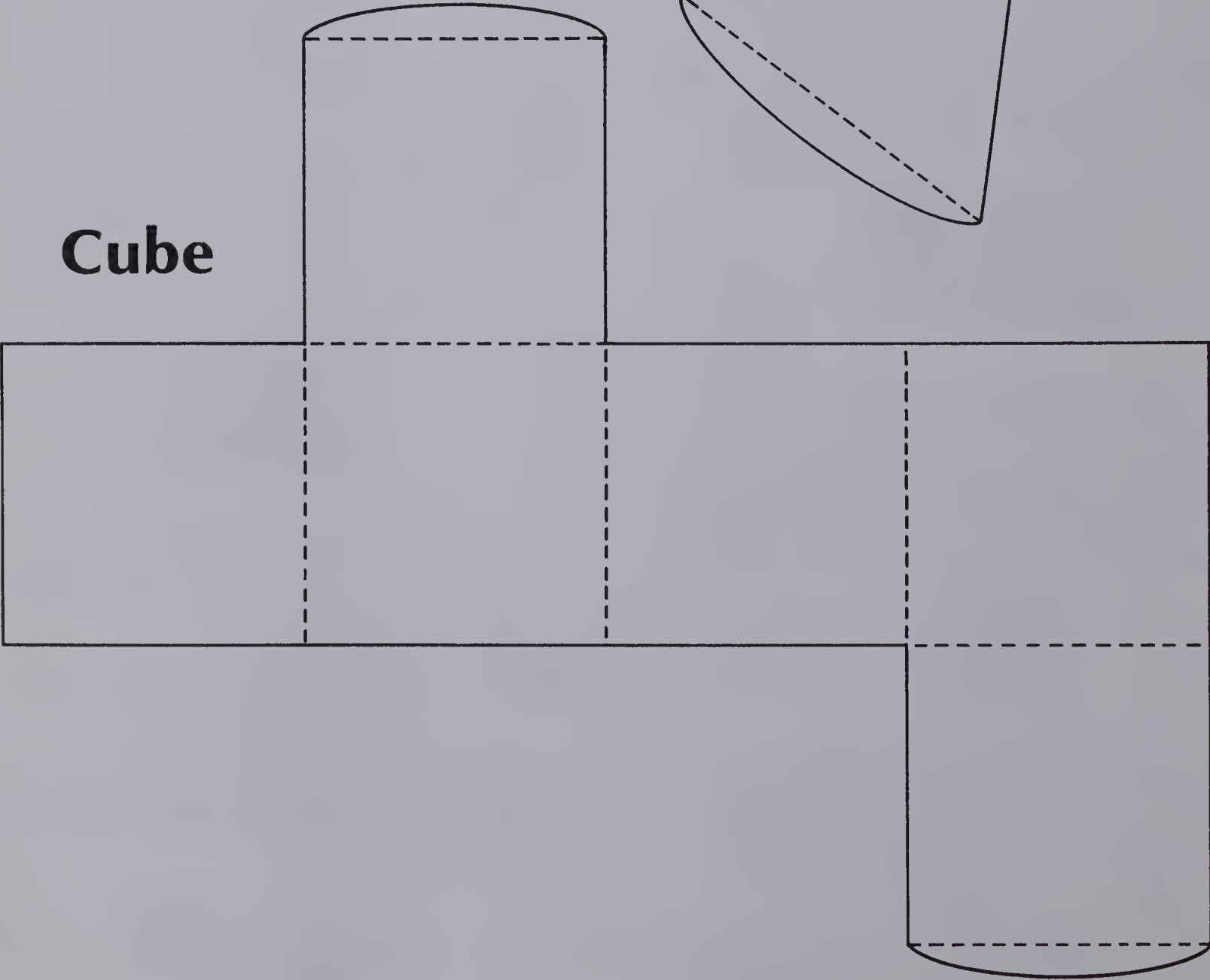


**Nets of solids**

**Pyramid**

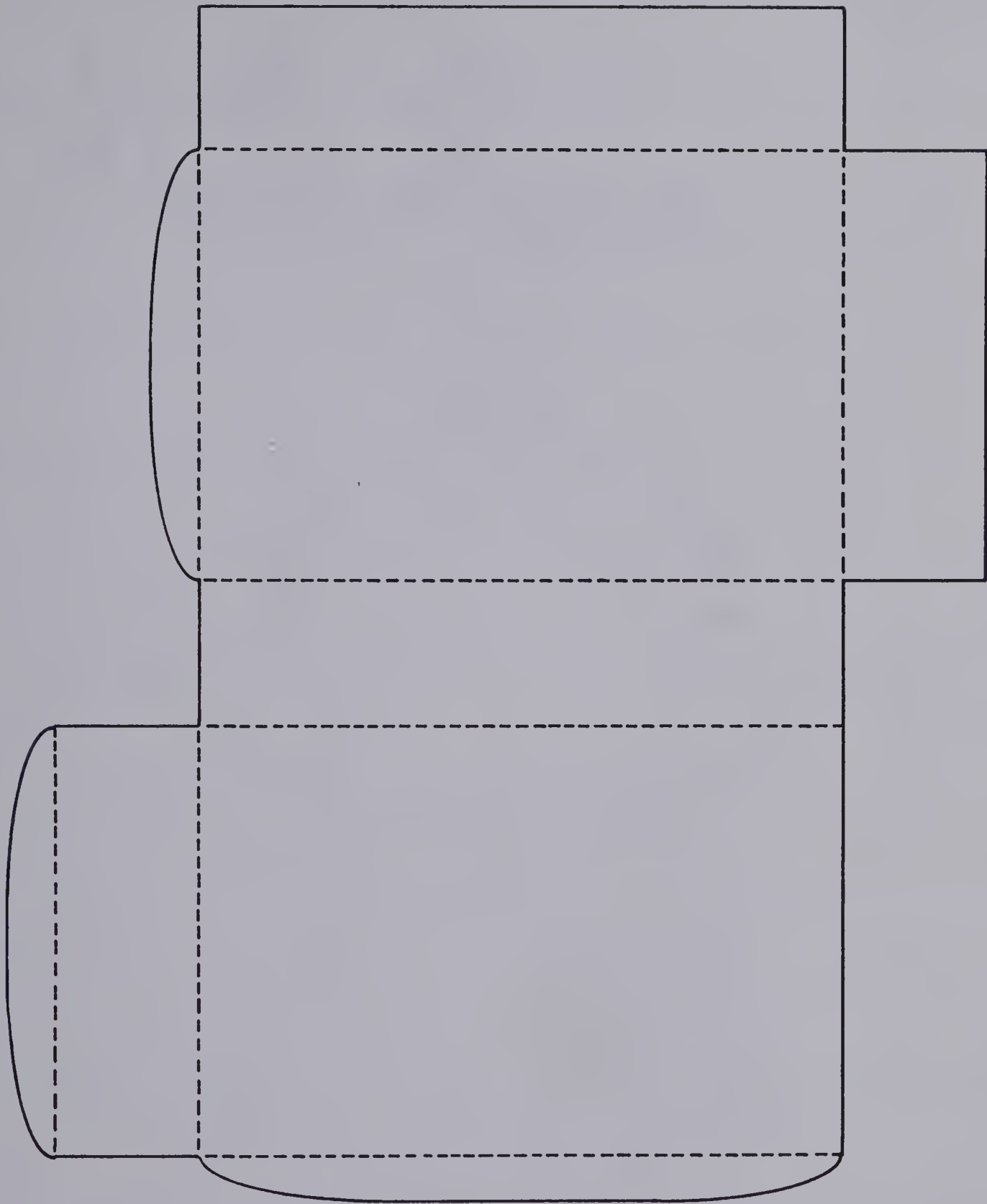


**Cube**



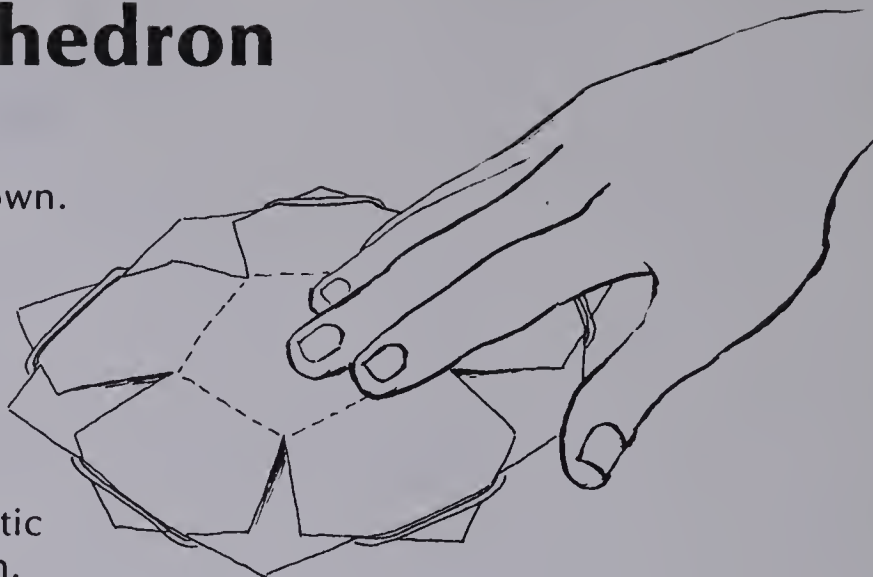


**Box**

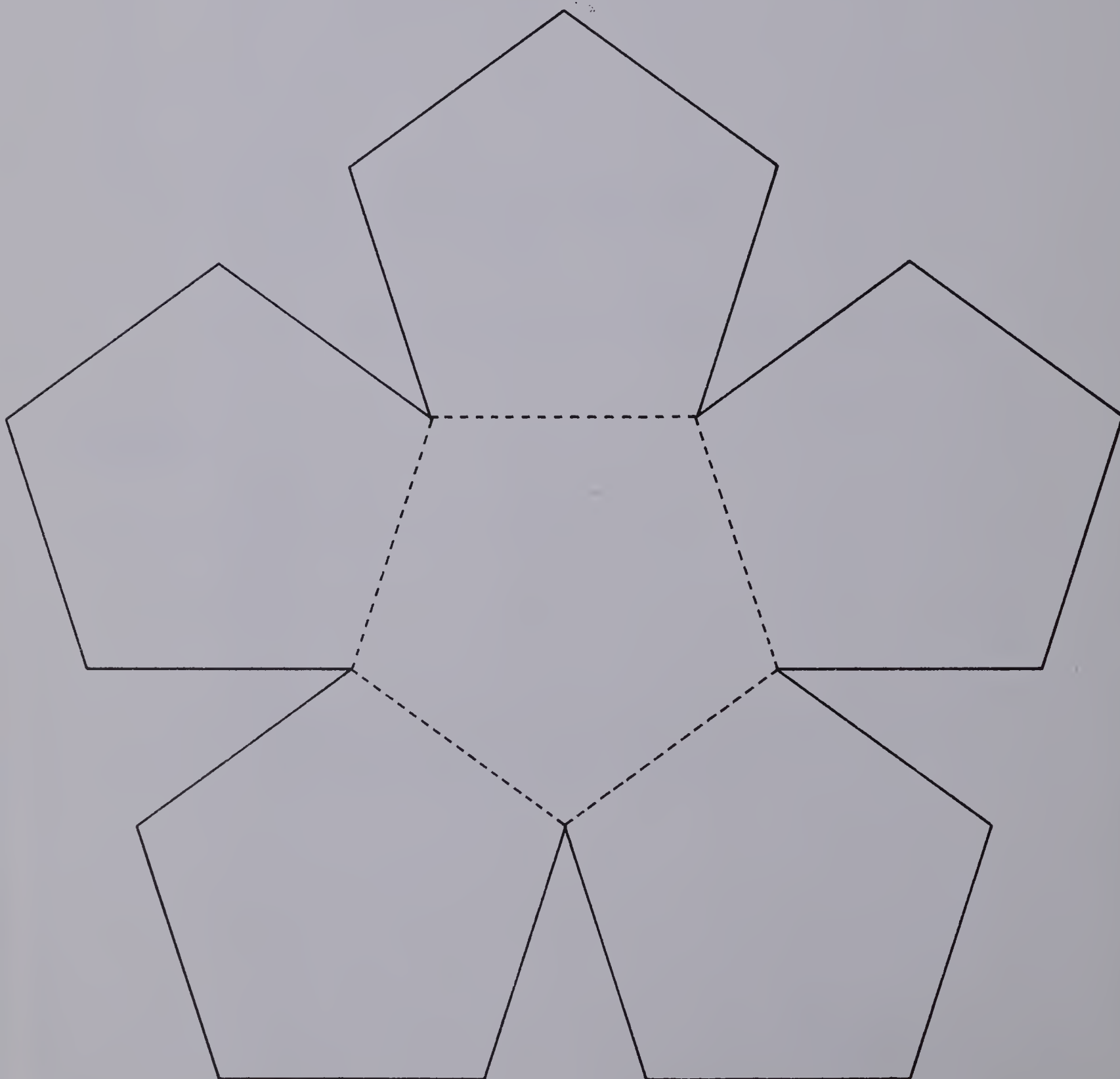


# Dodecahedron

Make copies of the net from cardboard.  
Combine the nets with a long elastic band as shown.  
You get a **dodecahedron**!



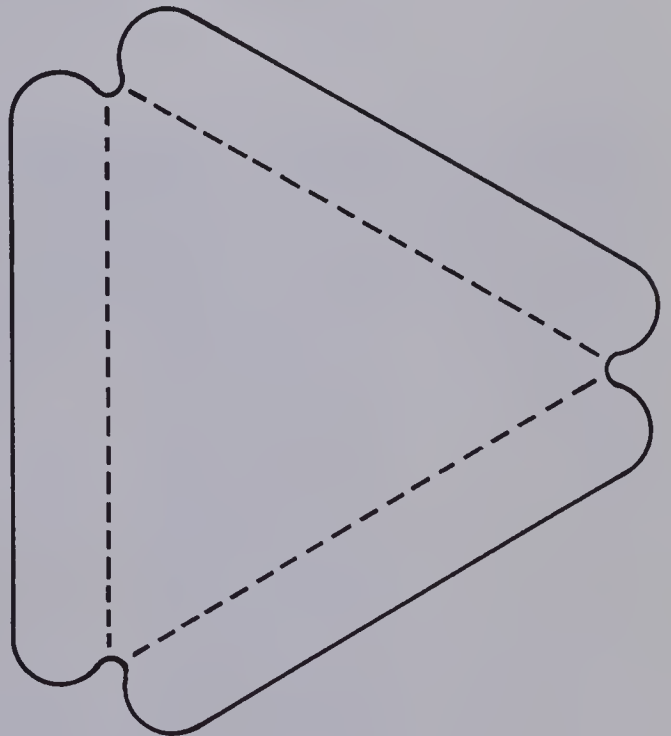
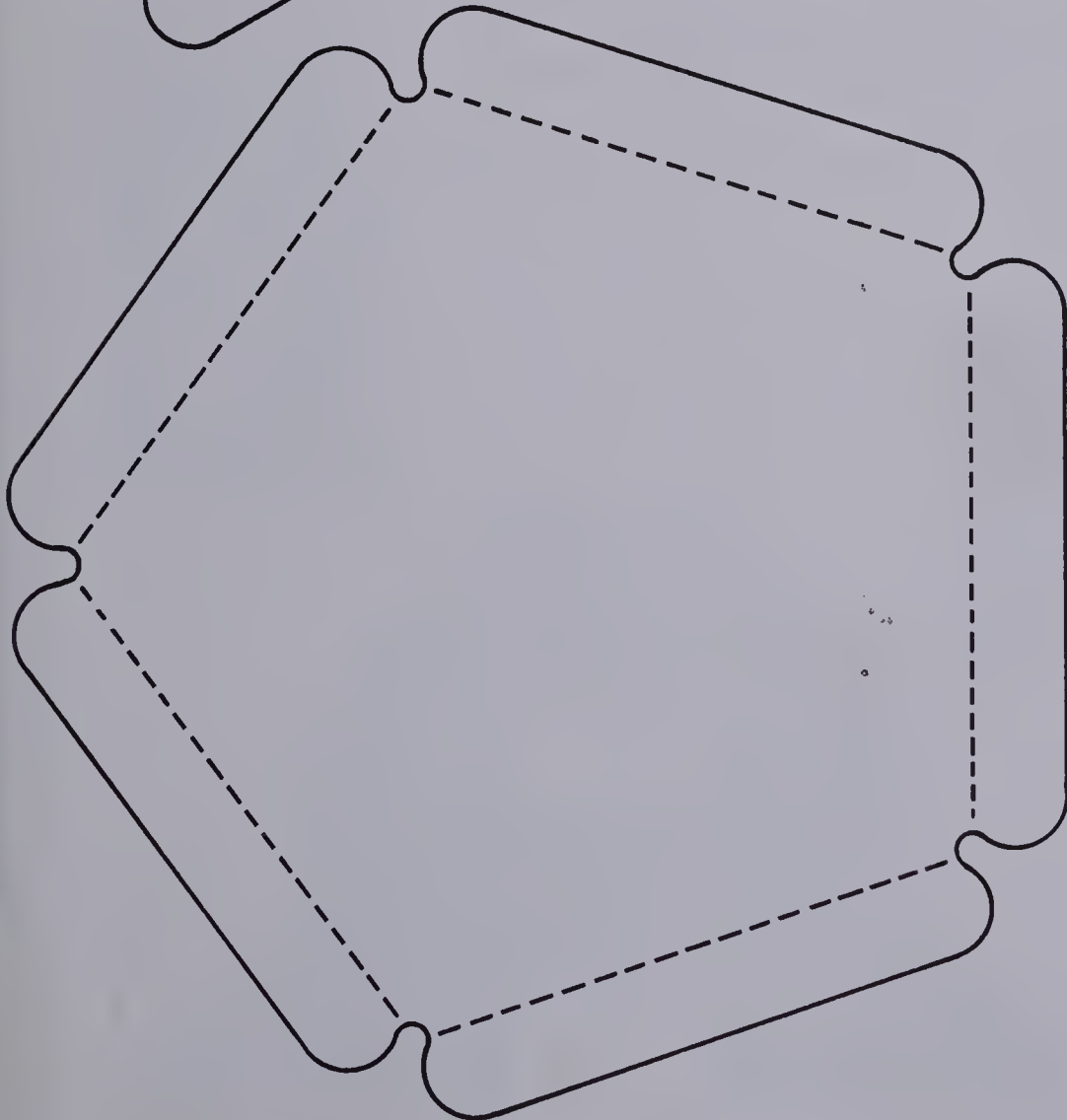
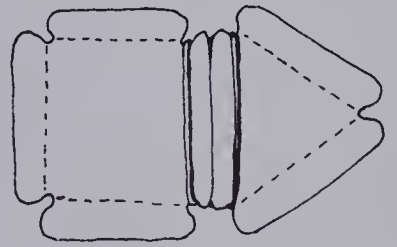
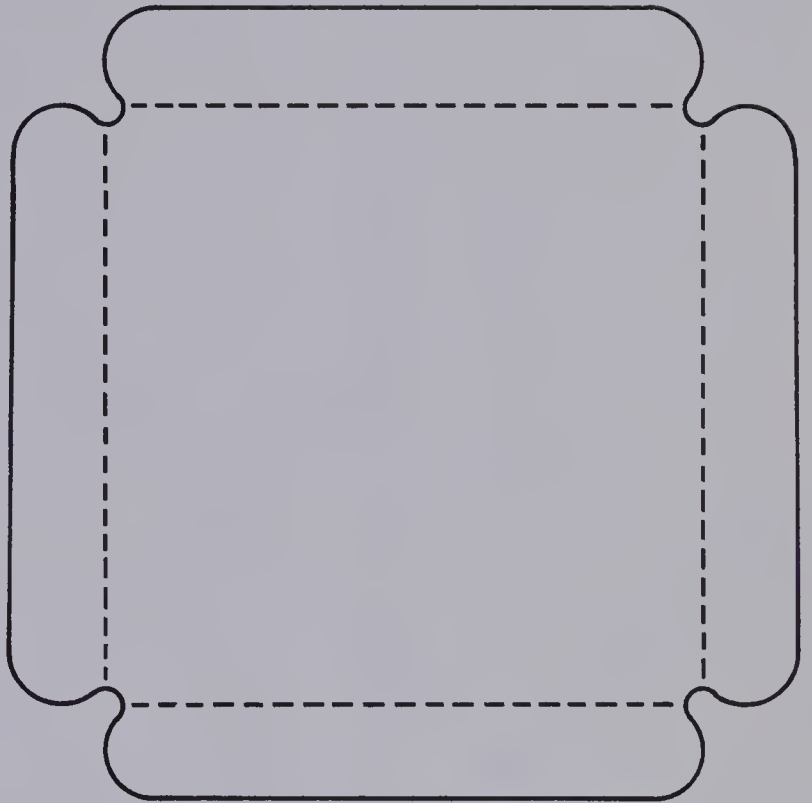
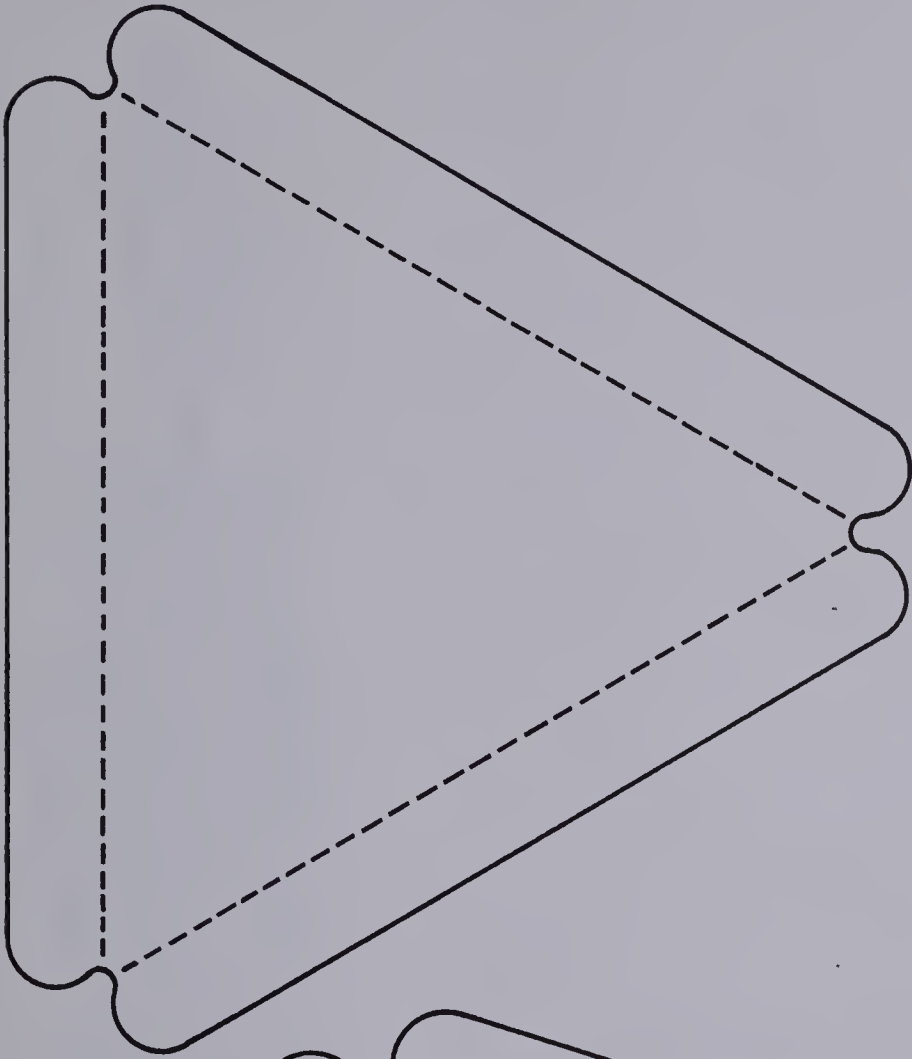
Weave the elastic  
bands as shown.



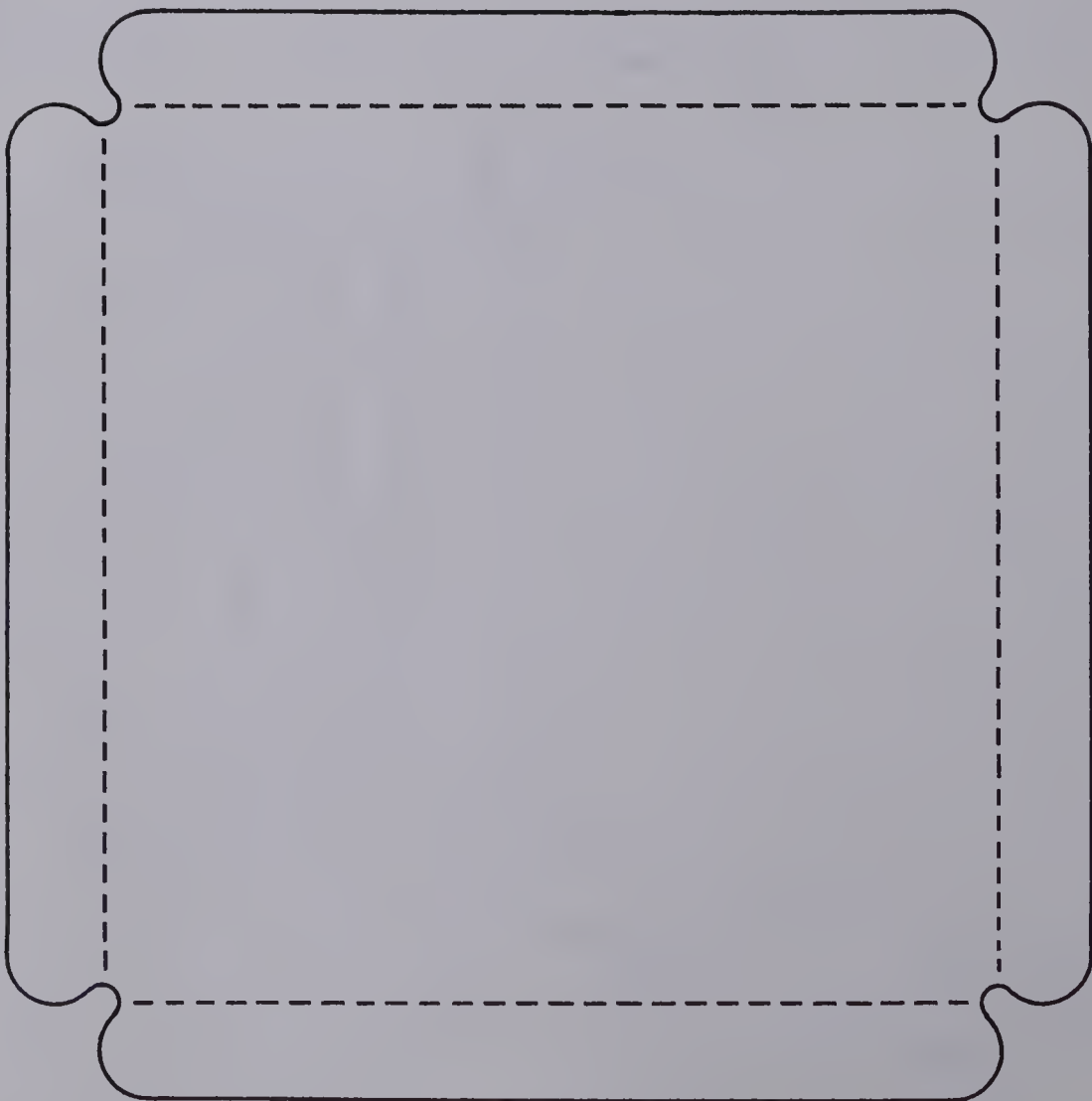
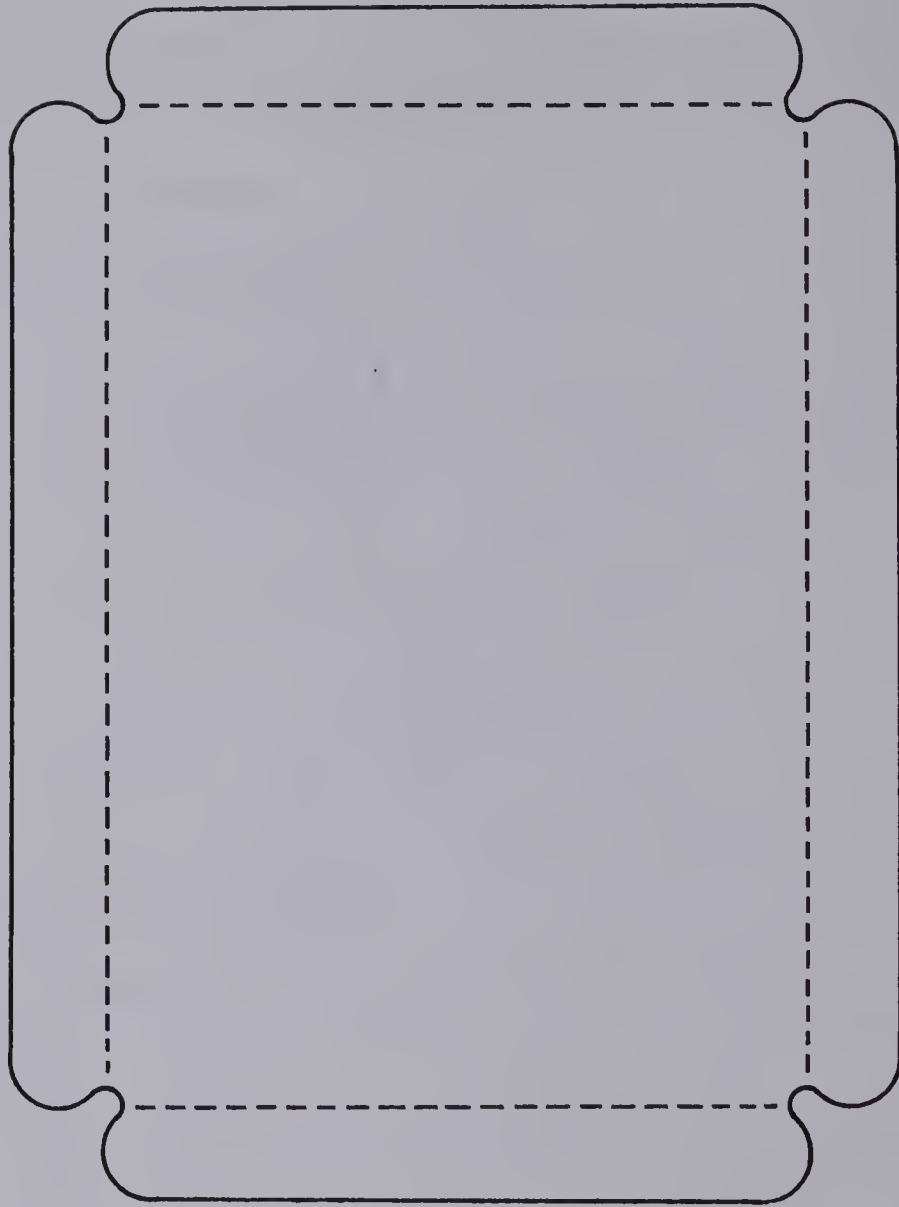


# Shells from Faces

Use these patterns to cut out cardboard faces.  
Students use the faces and elastic bands to construct shells.



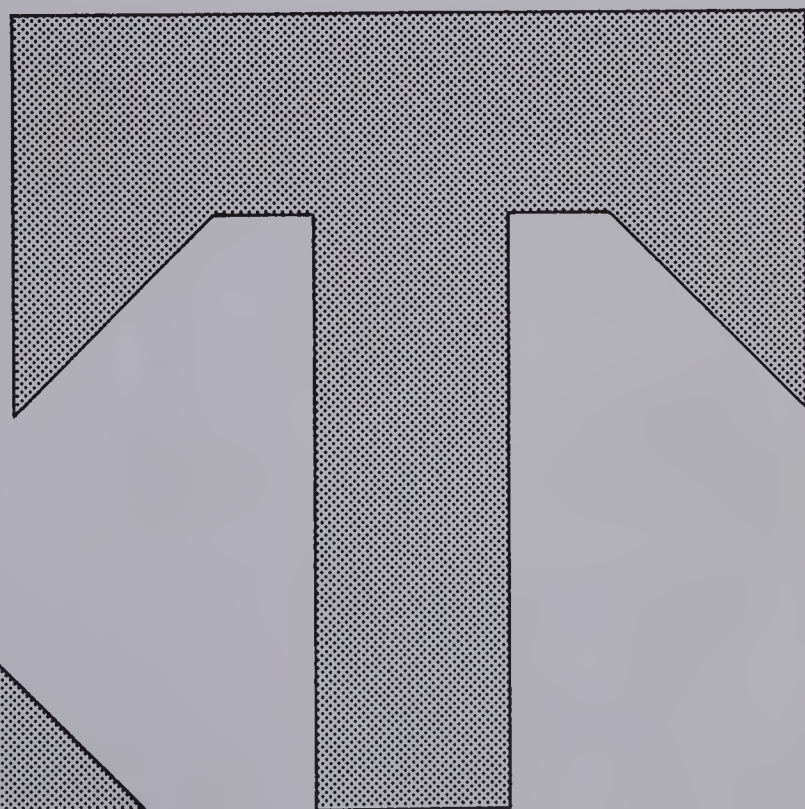
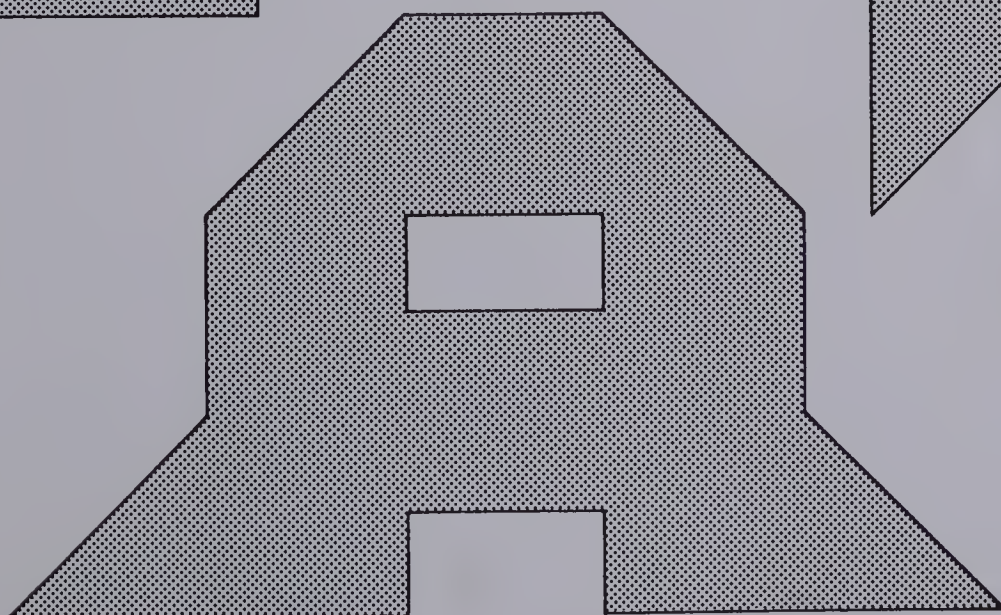
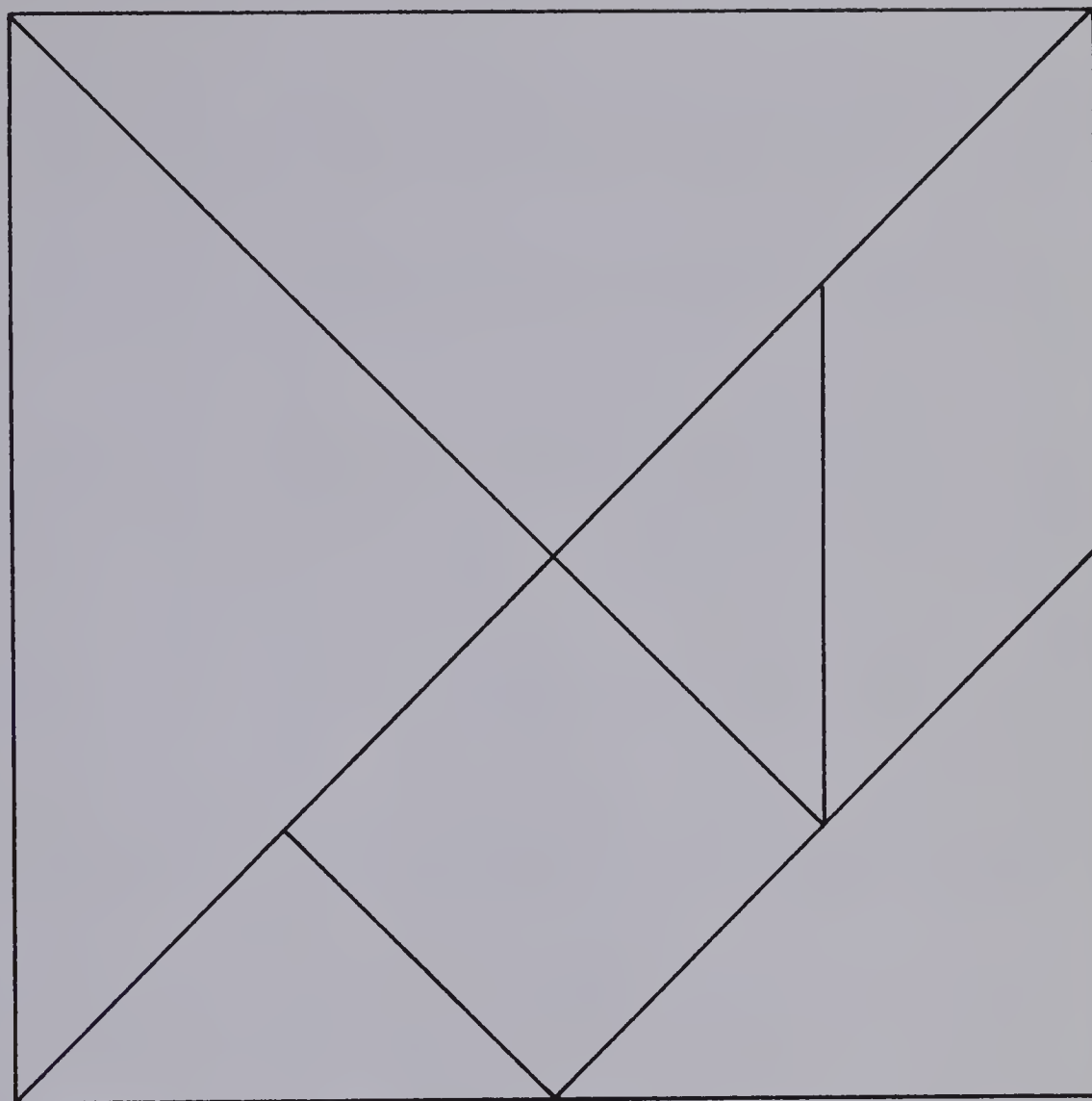
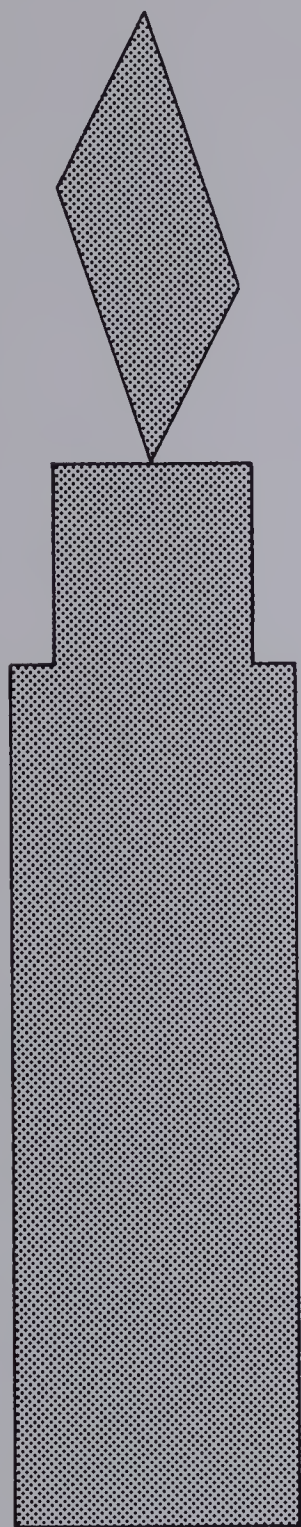
# Shells from Faces





# Similar Shapes

Trace several tangram puzzles onto cardboard.  
Challenge students to make shapes similar to those below.



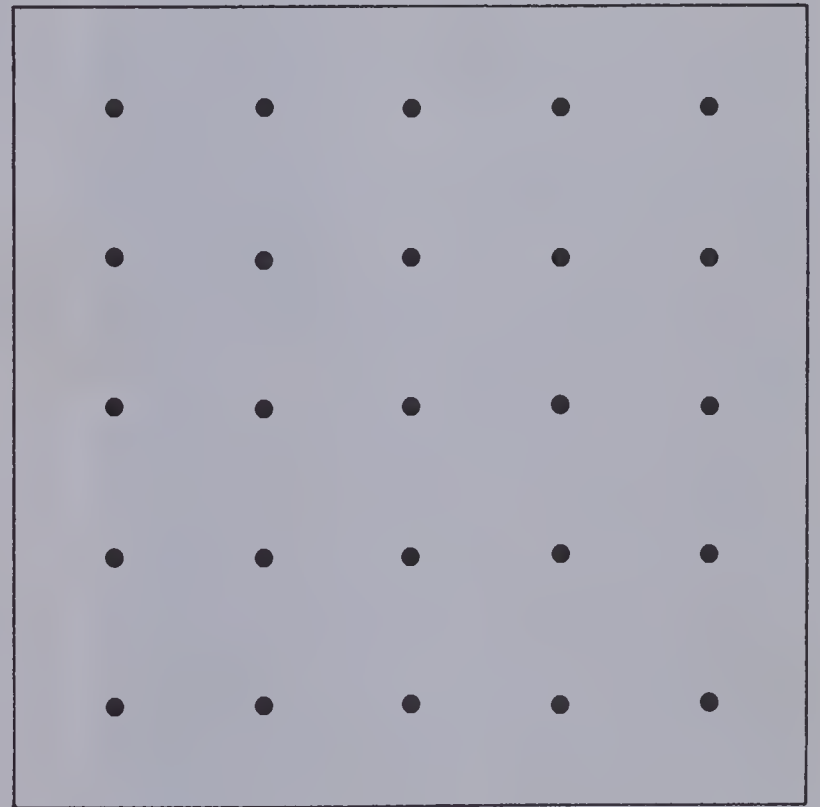
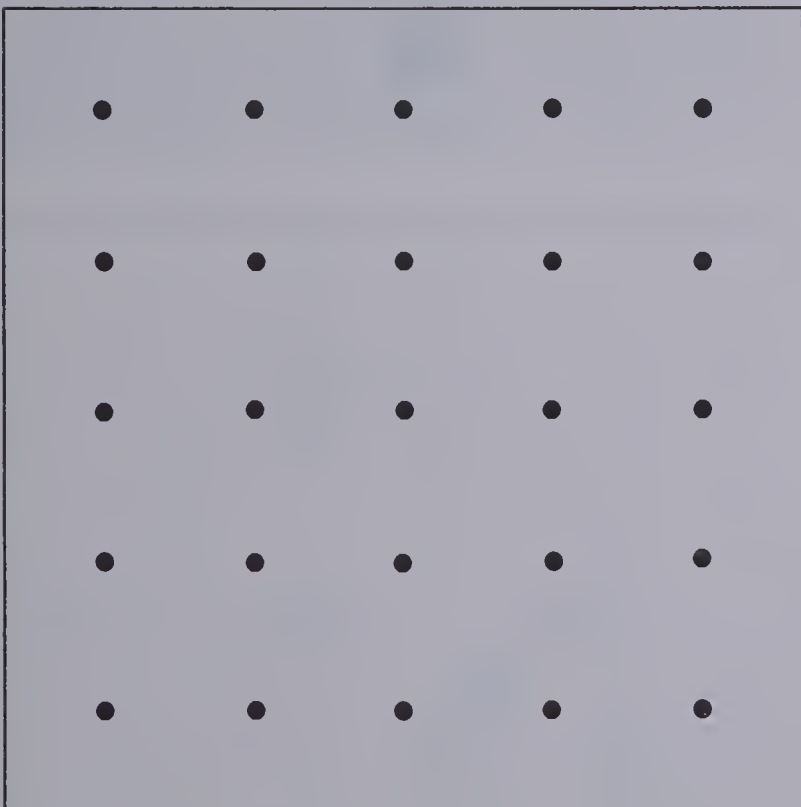
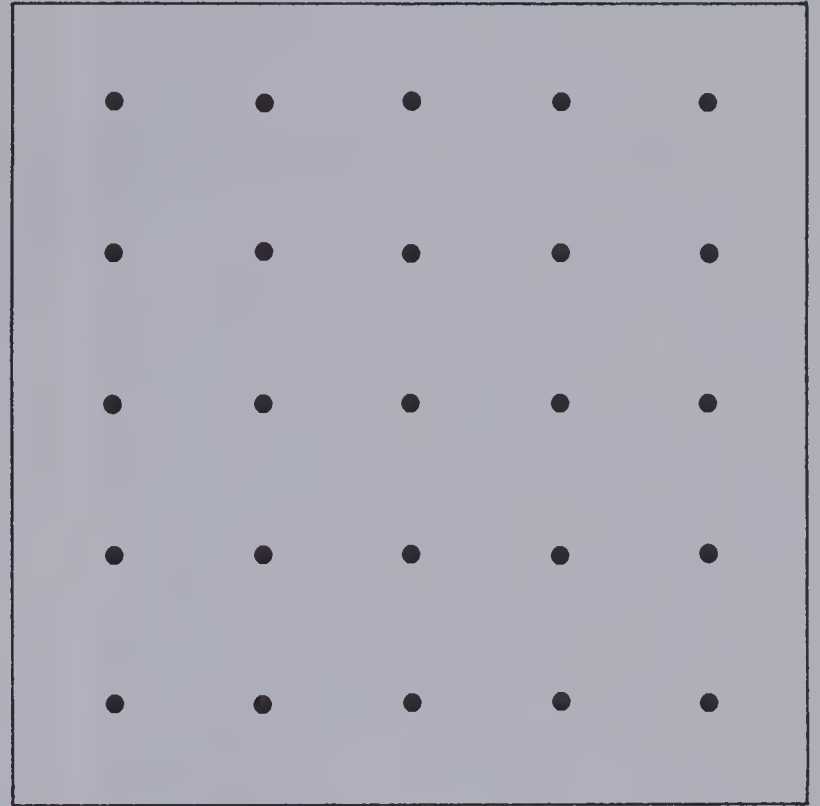
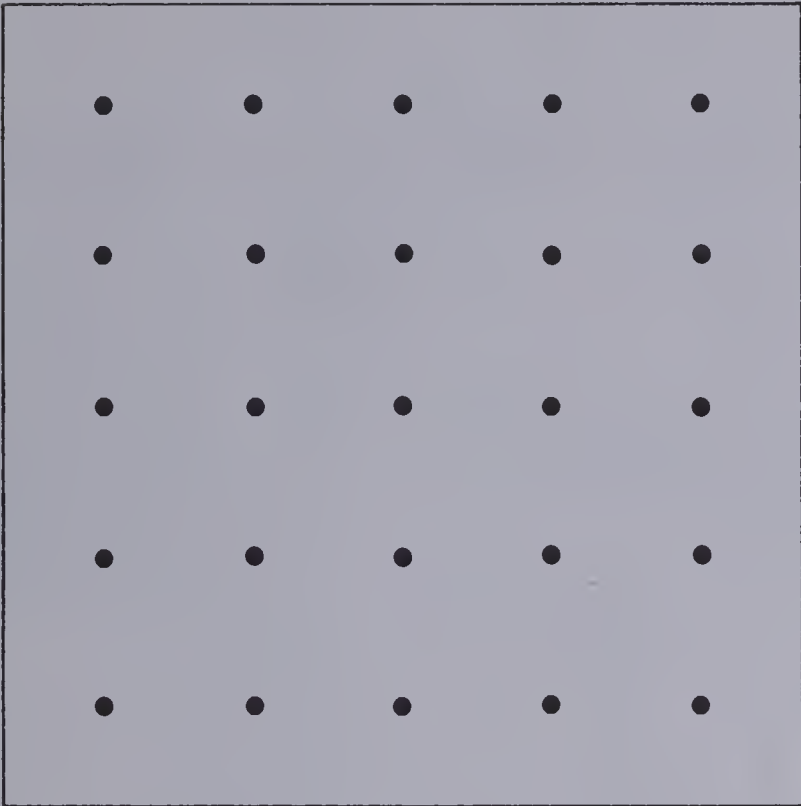
# Grids





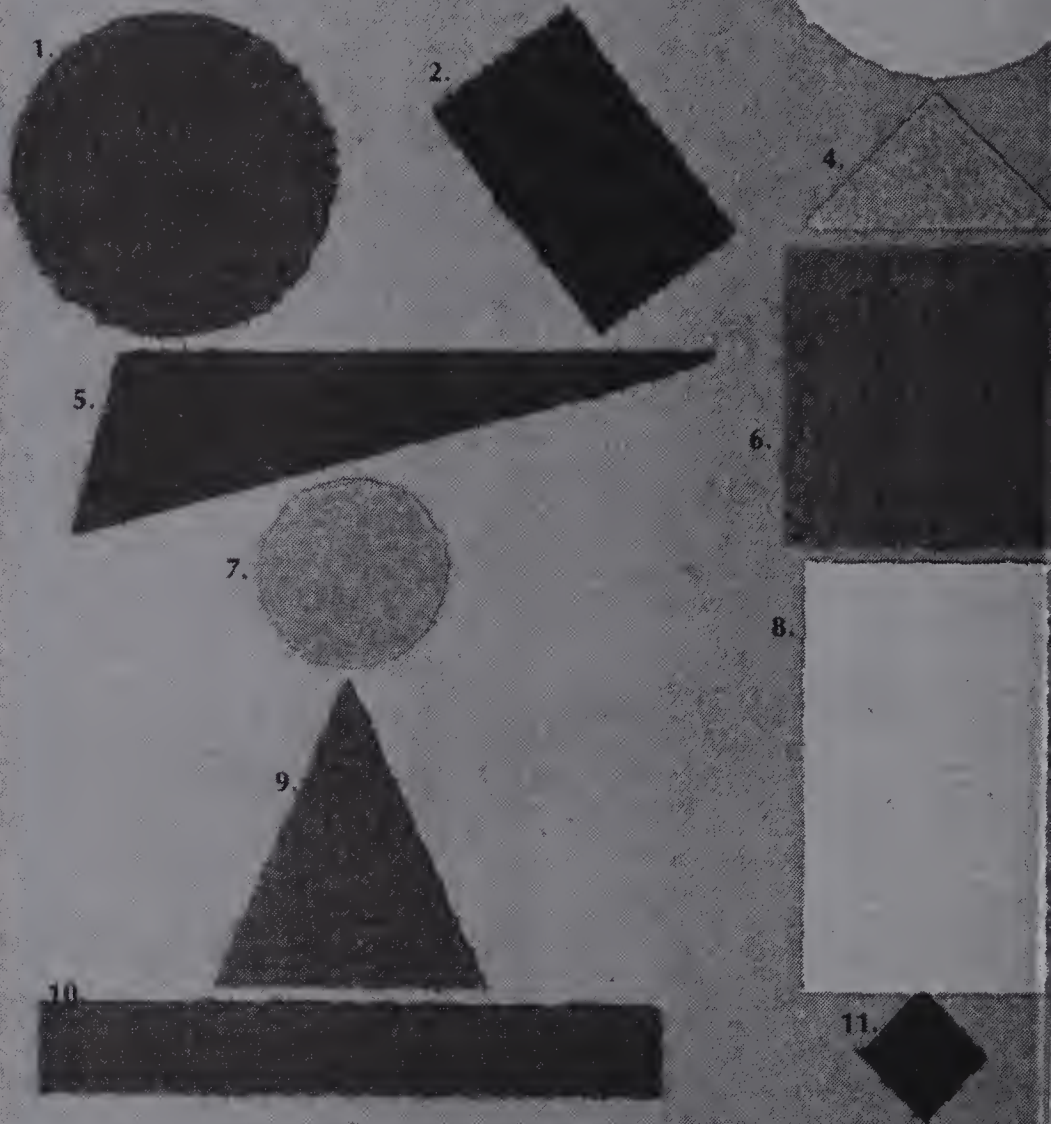


# Geoboard Grids



# UNIT 11

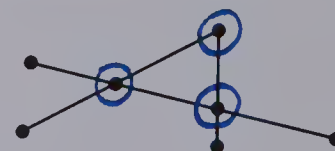
## GEOMETRY



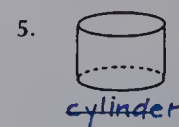
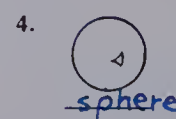
Unit 11 Objective	Test Questions	Pages
G4	1	202-203
G5	2-5	204-205
G6	6-8	206-207
G7	9-11	208-209
G8	12-14	210-211
GR2	15-18	212-213
G9	19-20	214-215

### Pretest

1. Circle each intersection point. How many? 3



Name each solid.



How many faces?



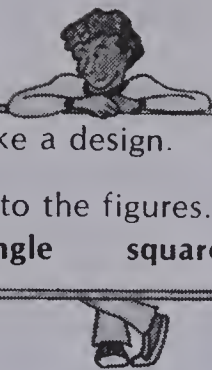
How many edges and corners?

9. box: 12 edges and 8 corners.

10. pyramid: 8 edges and 5 corners.



# Art That's Felt

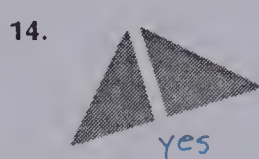
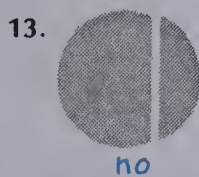
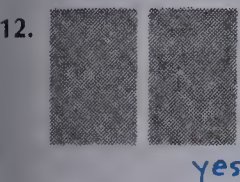


Brian used felt cutouts to make a design.

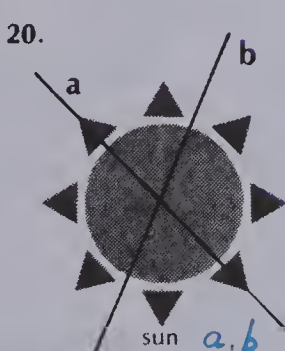
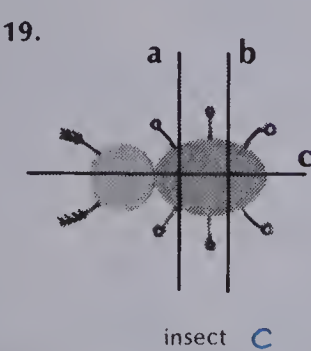
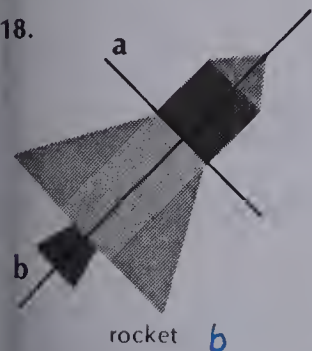
Help him match these names to the figures.

circle triangle rectangle square

Shelley cut these figures into two parts.  
Are the parts the same?



Mindy used her figures to make **symmetric** pictures.  
Which are **lines of symmetry**?



201

## UNIT 11

## PREVIEW

### Suggestions

Have available a black felt board (or a large piece of black construction paper) and a variety of smaller, brightly coloured pieces of paper with common outlines (circle, triangle, rectangle, square). With the students, slowly construct a geometry design that is interesting and pleasing. Encourage discussion, primarily reviewing the meanings of *circle*, *triangle*, *rectangle*, and *square*, and also using the terms *smaller*, *larger*, *above*, *below*, *beside*, *to the left*, *to the right*, *overlap*, and *cover*. Remind the students that a square is a special kind of rectangle.

Investigate **lines of symmetry** by folding. Then investigate the results of cutting and matching equal parts.

Note that instances of sliding, turning, and flipping are inherent in this and many similar activities.

### Reinforcement

#### Geometry 1 Workcard

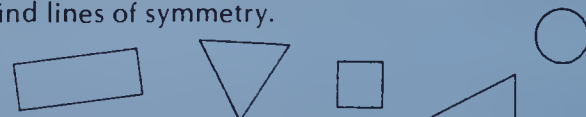
#### Shapes

Make a geometry design. Use circles, triangles, rectangles, and squares. Remember to label each figure.

#### Geometry 2 Workcard

#### Symmetry

Trace and cut out these figures. Fold to find lines of symmetry.



### Enrichment

Provide the students with rectangular paper about 20 cm by 10 cm for these activities.

#### Geometry 3 Workcard

#### Symmetry

1. Fold a piece of paper along a line of symmetry.
2. Paint one part with thick paint.
3. Fold the paper again and press.
4. Write a short story telling what you see.



#### Geometry 4 Workcard

1. Fold a piece of paper along a line of symmetry.
2. With scissors cut out a small shape.
3. Use the symmetric window to paint repeating patterns.

1. cylinder: 2 edges and 0 corners.

Write **different**, **same shape**, or **same size and shape**.



12.



same shape

13.



different

14.



same size and shape

Colour the square.

5. (2, 1)

16. (3, 3)

7. (1, 4)

18. (4, 2)

Draw in the new square.

9. Slide ☆ right 2, up 1.

10. Slide ■ left 2, down 1.



## Objective G4

Identify and investigate straight line segments and points.

## Introducing the Lesson

Display a collection of classroom objects that suggest **points** and **straight line segments**. In turn, say, "This reminds me of a point," and "This reminds me of a segment."

Have someone draw a point and straight line segment on the chalkboard. Say, "That reminds me of a point and this reminds me of a segment, but they are both too thick." Lead the students to some understanding that a point and a segment have no thickness by comparing a ball, marble, grain of salt ... (rope, string, thread ...).

## Teaching the Lesson

Hold up a toothpick to emphasize its length and ask, "What does this suggest?" **Segment**. Emphasize the toothpick's point and ask, "What does this suggest?" Identify the points at the end of a segment as **endpoints**. Challenge someone to try to draw a segment with only one endpoint (not possible).

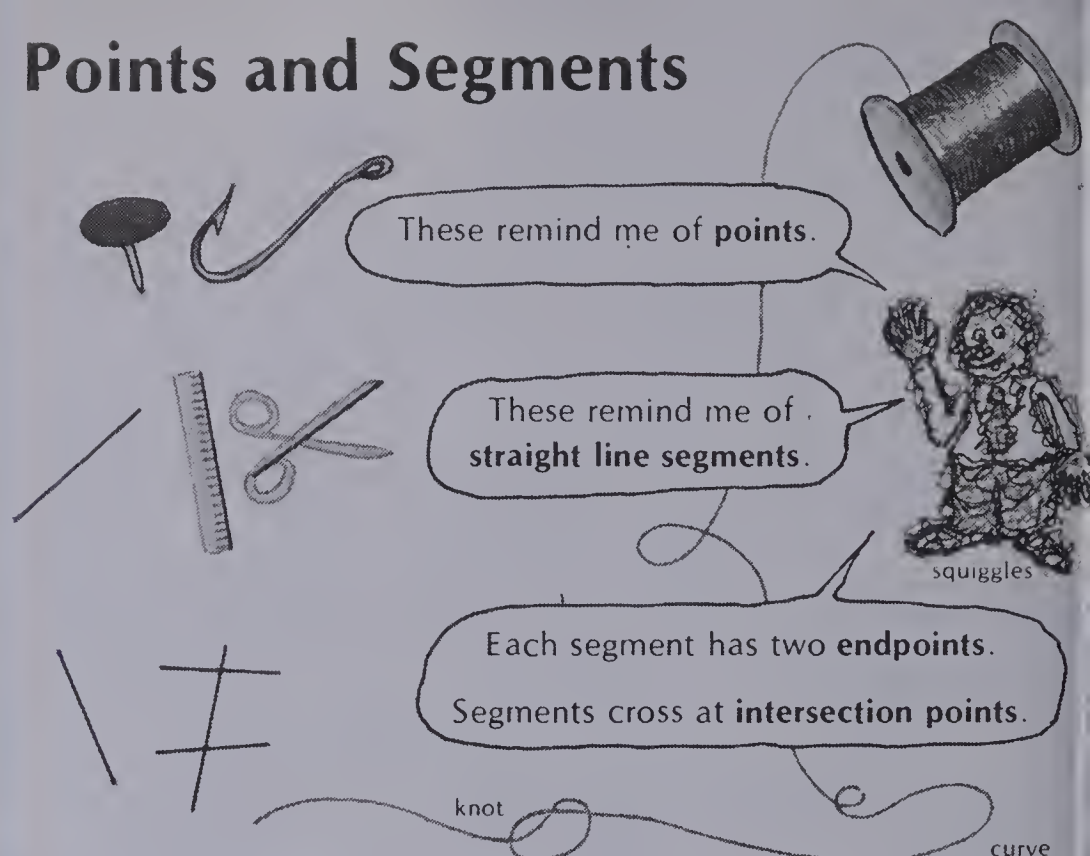
Discuss the word "intersection". What does it mean to the students? Some may say it is where two streets cross. Explain that, in math, it is *the point where two lines or segments cross*.

Discuss these examples of intersection points.



Read the presentation on page 202 together.

# Points and Segments



## EXERCISES

Does it remind you of a point or a segment?

1. **Segment**

2.

**Point**

3.

**Point**

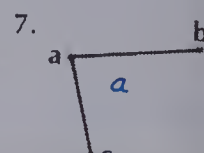
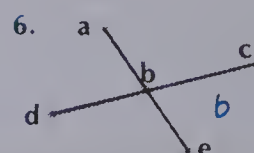
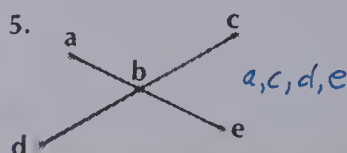
4.

**Segment**

Answers can vary. Discuss them.

Which are endpoints?

Which are intersection points?



## Using the Exercises

- Discuss questions 1 to 4 with the students. Allow all answers, provided that the students' explanations show that they understand the concepts of point and segment.
- Questions 5, 6, and 7 will determine whether students understand the difference between endpoints and intersection points. Note that both can apply, as in point a of question 7.



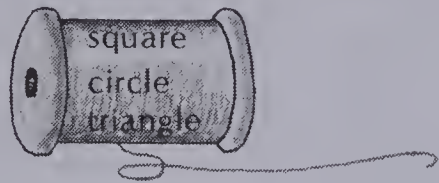
## PRACTICE

Draw a picture for each. Use a ruler.

1. a straight line segment
2. a point
3. two endpoints
4. a curve
5. an intersection point
6. a knot
7. three segments sharing one intersection point
8. three segments sharing three endpoints

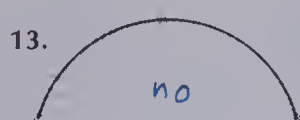
Match each with a figure.

9. 3 segments *triangle*
10. 4 segments *square*
11. a curve *circle*



A curve can be drawn through three points.

Can one straight segment be drawn through the three points?



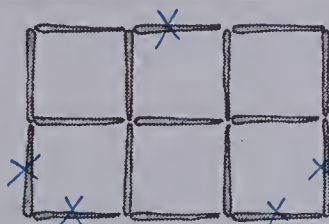
14. Which is longer: the curve or the straight segment? *curve*

15. Try to print the alphabet using only this curve and straight line segments.

*ABC...*

## Missing Segments

If five are lost, three squares are left. Which segments are lost?



*Answers may vary.*

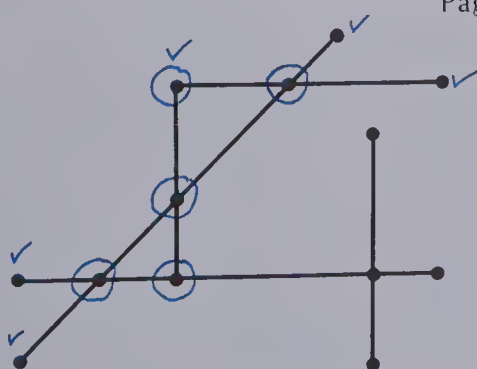
203

## Extra Practice

Circle 5 intersection points.

Check (✓) 5 endpoints.

Colour 5 line segments.



Draw a figure with 4 line segments, 4 intersection points, and 8 endpoints.

Hint: Use 4 toothpicks.



## Worksheet G4

Pages 202-203

## Assigning the Practice

Minimum: 1-6, 9-11

Average: 1-11

Enriched: 1-15

## Reinforcement

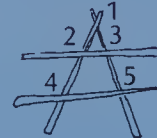
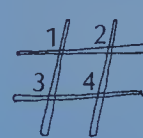
### Geometry 5 Workcard

### Segments and Points

Take 4 toothpicks.

1. Make a figure with 4 intersection points.
2. Make a figure with 5 intersection points.
3. Make a figure with 6 intersection points.

Draw a picture of each.



### Geometry 6 Workcard

### Segments and Points

Make the letters of your name on a geoboard with elastic bands.

Draw your name on dot paper.

## Enrichment

Supply toothpicks for students to investigate *Missing Segments* at the bottom of page 203.

### Geometry 7 Workcard

### Segments and Points

Make this figure using toothpicks.



1. How many small squares do you see? how many big squares? how many squares in all?
2. Take away 4 toothpicks so 3 squares are left.
3. Take away 5 toothpicks so 5 squares are left.

### Geometry 8 Workcard

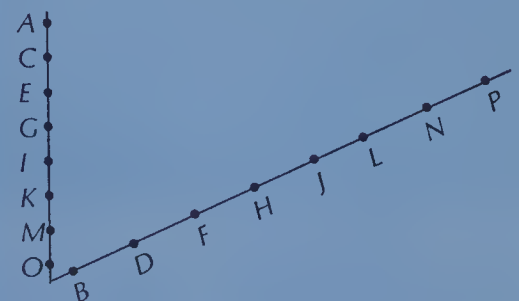
### Segments and Points

Make a picture using only toothpicks and glue.

### Geometry 9 Workcard

### Segments and Points

1. Use a large needle and string to sew from A to P.
2. Invent your own string art.



## Objective G5

Identify and construct common geometric solids.

## Introducing the Lesson

Make a collection of common objects having simple geometric shapes (or have the students bring them in). Discuss the shapes of the objects and sort them into different groups, such as flat and curved surfaces, numbers of flat surfaces, numbers of edges, numbers of corners, and so on.

## Teaching the Lesson

Introduce the names of solids and show common examples of each.

**cube:** sugar cube, ones cube, salt crystal

**cone:** ice cream cone, megaphone, pencil point

**sphere:** ball, globe

**cylinder:** soup can, new pencil, garbage can

**pyramid:** family tent, paper hat

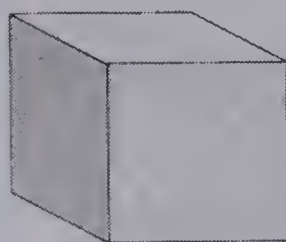
**box:** pencil box, teacher's desk, lunch box

**prism:** tent, house roof, wedge

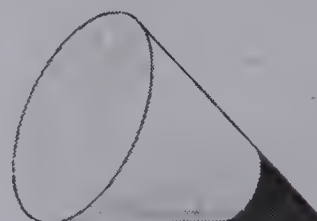
Stress that the last two solids are both **prisms**, but we will use the special name **box** for the rectangular prism. Cover each student's book with transparent plastic wrap. Supply everyone with clay, a table knife, and a section of newspaper. Challenge the students to make models of the seven common geometric solids.

## Solids

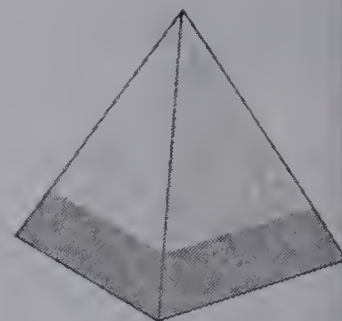
Martin enjoys painting on clay solids.



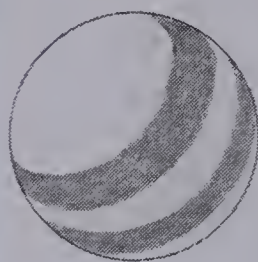
cube



cone



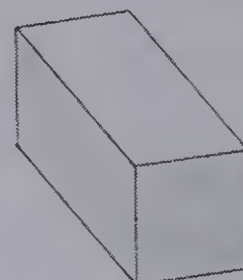
pyramid



sphere  
(ball)



cylinder  
(can)



box  
(rectangular prism)



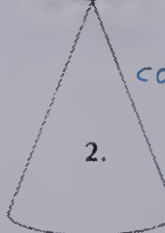
prism  
(triangular prism)

## EXERCISES

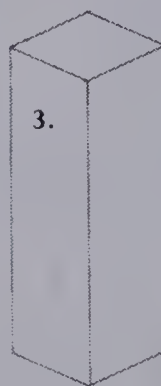
Name each solid.



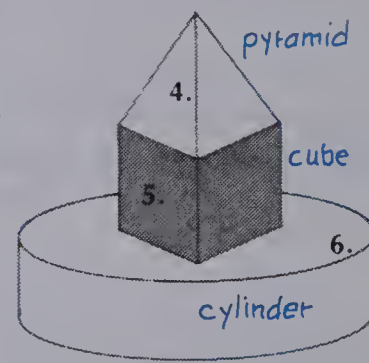
sphere



cone



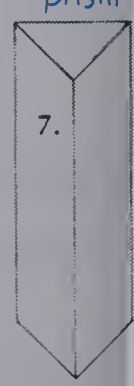
box



cylinder

pyramid

cube



prism

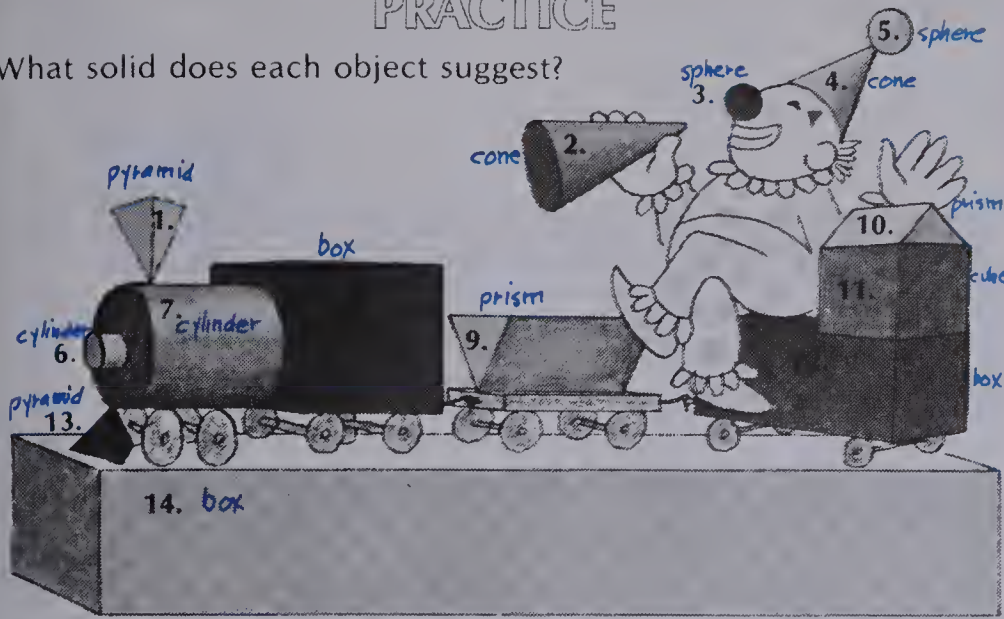
## Using the Exercises

- Use these 7 questions to determine whether students can now recognize the seven solids from pictorial representations and can match them to the correct names.
- If students are advanced enough to identify solids by verbal description alone, ask them the following riddles.
  - I have one square face and four triangular faces. What am I?
  - I have only two triangular faces. What am I?
 Have the students make up their own riddles. Caution them that their riddles must have only one answer. This is to encourage them to look for similarities and differences.



## PRACTICE




What solid does each object suggest?

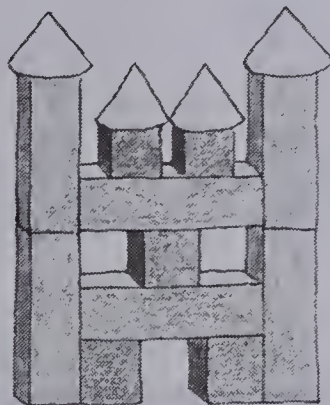


15. orange sphere
16. book box
17. tent prism or pyramid
18. toy box box or cube
19. sugar cube cube
20. funnel cone
21. tin can cylinder
22. globe sphere
23. rainbow prism
24. Which solids won't roll? box, cube, prism, pyramid
25. Which solid rolls only in a circle? cone

## Castle Costs

How much does the castle cost?

	8¢ each	40¢
	6¢ each	24¢
	7¢ each	42¢



Hint! Multiply and add.

Total cost: \$1.06

205

## Assigning the Practice

Minimum: 1-14

Average: 1-25

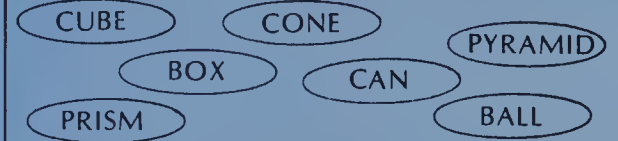
Enriched: 1-25

## Reinforcement

### Geometry 10 Workcard

Solids

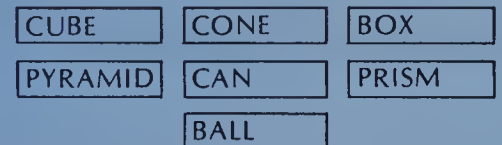
Put 20 geometry blocks on the table onto the correct plates.



### Geometry 11 Workcard

Solids

Use 7 blank cards to make these signs.



Label 7 things in our class that suggest these solids.




## Enrichment

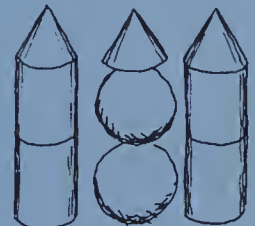
Assign Castle Costs at the bottom of page 205.

### Geometry 12 Workcard

Solids

How much?

	1¢
	10¢
	\$1.00



### Geometry 13 Workcard

Solids

Build each of these using geometry blocks.

1. a tall tower
2. an igloo
3. a canal
4. a high rise
5. a tunnel
6. a robot

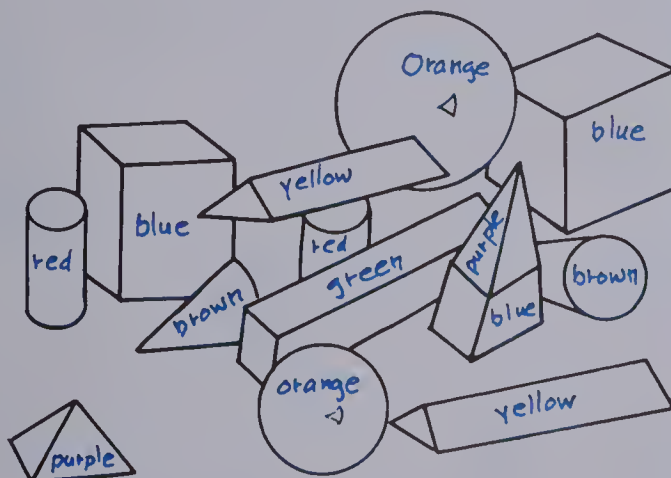
## Extra Practice

### Worksheet G5

Pages 204-205

Color the solids as shown.

boxes:	blue
boxes:	green
boxes:	brown
boxes:	orange
cylinders:	red
spheres:	yellow
(triangular) pyramids:	purple















## Objective G6

Identify and investigate the faces of common solids.

## Introducing the Lesson

Set up an overhead projector behind a small cardboard barrier so that the students can easily see the screen, but not see the projection surface directly. Introduce the guessing game "Secret Solid". In turn, hold up three different solids to the class. Turning the projector off and then on, project one surface or face onto the screen. Someone explains which solid is being projected.

Solids shown.	Projection.
	
	
	
	
	
	Answer is ambiguous. 

**Cautionary Note:** Although the projection of solids is a motivating introduction to faces, it can become misleading. For example, observe the projection of the cone, can, and pyramid laid on their "sides".

## Teaching the Lesson


Read and discuss the presentation on page 206. Using geometric models, determine for each solid the kinds of **surfaces** (round, flat) and the shapes of the **faces**.

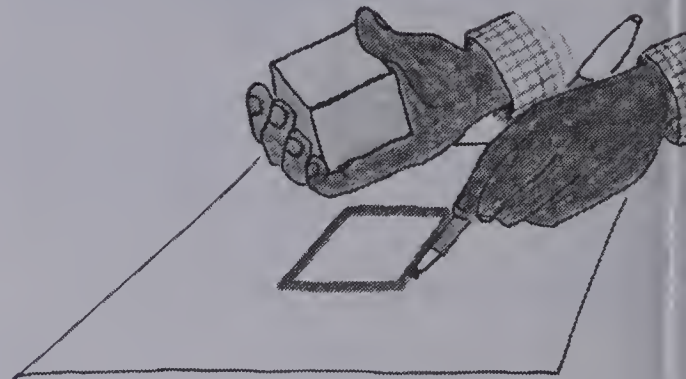
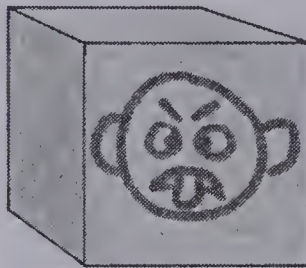
## Faces

Solids have **surfaces**.  
A flat surface is called a **face**.

rounded surface

face

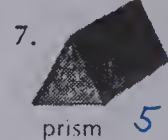
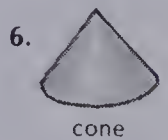
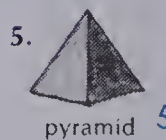
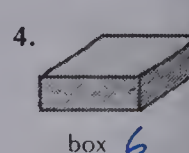
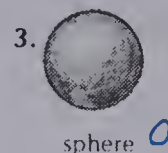
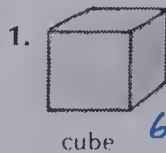
You can draw a  on a face.  
You can trace around faces.



## EXERCISES

How many faces does each solid have?

Use models.













8. Name three solids with rounded surfaces. *cone, cylinder, sphere*

## Using the Exercises

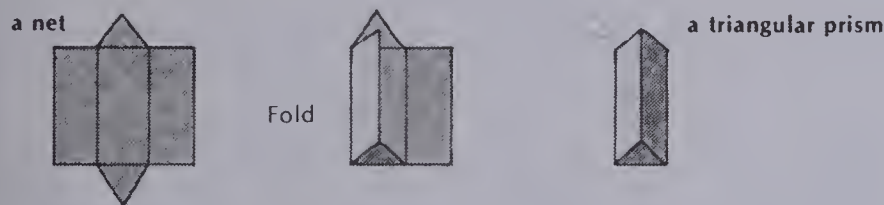
- Supply models of the geometric solids. Discuss ways of counting faces so that all faces get counted and none is counted twice or left out. Finger tips can be placed on faces as they are counted. Faces can be marked with a pencil if this does not permanently deface the models.



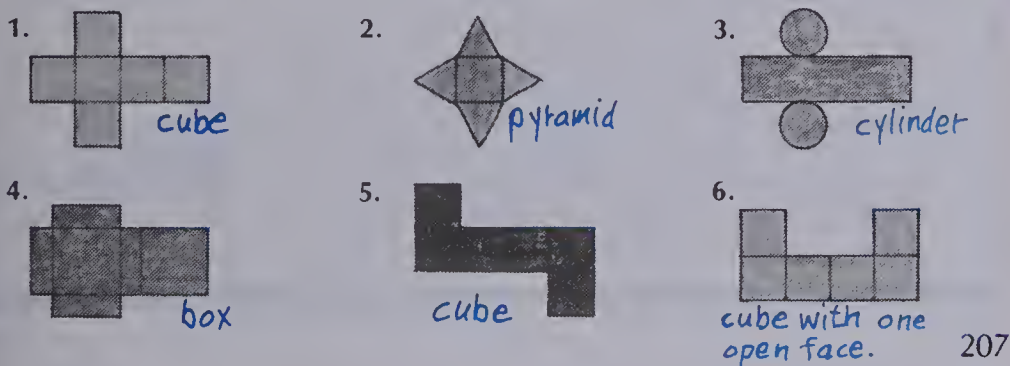
## PRACTICE

Solids	How many faces look like these?		
			
cube 	1. 0	2. 6	3. 0
pyramid 	4. 4	5. 1	6. 0
box 	7. 0	8. 6	9. 0
prism 	10. 2	11. 3	12. 0
cylinder 	13. 0	14. 0	15. 2
sphere 	16. 0	17. 0	18. 0
cone 	19. 0	20. 0	21. 1

## smART and CRAFTy



What will you get by folding? Guess and test.



207

## Assigning the Practice

Minimum: 1-21

Average: 1-21

Enriched: 1-21

## Reinforcement

### Geometry 14 Workcard

Solids

Trace around the faces of these solids.

BOX PRISM CYLINDER CONE

Label the solids and figures.




























### Geometry 15 Workcard

Solids









Play "Faces Bingo" with two friends.

Explain to the class the rules of "Faces Bingo". Each player gets a plastic-covered bingo card, the cells of which contain 6 squares, 6 rectangles, 6 triangles, and 6 circles.

#### Players Card

F	A	C	E	S
				
				
				
				
				

#### Caller's Card

	F	A	C	E	S
1.					
2.					
3.					
4.					
5.					
6.					

In turn, the caller draws a letter card and a geometry model and calls out the combination, e.g., "C box". The player may place a bingo chip over any item in Column C that shows the face of a box. Sometimes there will be more than one. The winner is decided in the standard manner. To check the winning card, the winning faces are compared with the corresponding solids.

## Enrichment

This workcard can be used before or after smART and CRAFTy at the bottom of page 207.

### Geometry 16 Workcard

Solids

Cut out the figures called **nets**.

Fold along the dotted lines.

Use tape to construct the **shells** of solids.

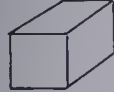








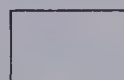






Many fascinating, paper-folding activities are suitable for Grade 3 students. Ask your librarian to locate craft books on origami or paper art.

## Extra Practice

### Worksheet G6

Pages 206-207

Colour the kinds of faces each solid has.

	1. 		
	2. 		
	3. 		
	4. 		

Objective G7

Identify the edges and corners of common solids.

Introducing the Lesson

Discuss **edges** and **corners**. Ask what they are. Ask the students for examples, such as the edge of a cliff, the edge of a desk, street corners, the corner of a room, and so on.

Teaching the Lesson

Use models to demonstrate the common solids and discuss the presentation on page 208. Explain that edges and corners have special meanings when we talk about geometric solids. Students should also manipulate the models.

Develop statements of student observations to make the meanings of *edge* and *corner* concrete and personalized.

Edges:

"You can follow an edge with your finger."

"You could walk along an edge, if you were small."

"When you trace around the face, you are really tracing along the edges of the face."

"Edges are to solids what sides are to figures."

Corners:

"You can poke your finger with a corner."

"You could sit on a corner, but it would hurt."

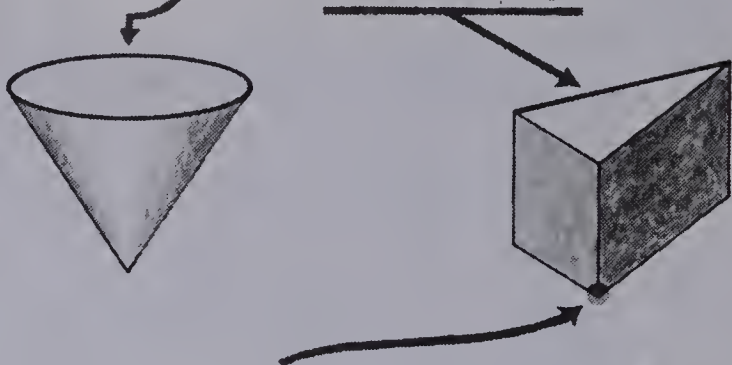
"A corner is like a point."

A **skeleton** of a solid consists of its edges and corners. Supply each student with straws and Plasticene and with models of a cube, box, pyramid, and prism. Challenge the students to construct skeletons that suggest the solids on their desks.

Edges and Corners

Many solids have **edges**.

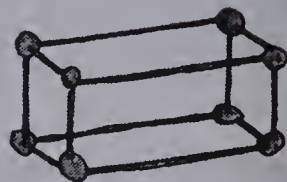
An **edge** can be a curve or a straight line segment.



Some solids have **corners**.

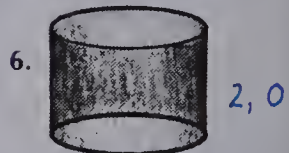
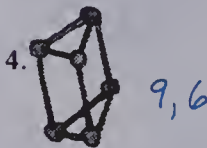
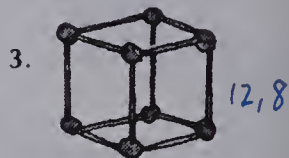
Corners are often at the endpoints of edges.

Skeletons of some solids can be made with straws and Plasticine.



EXERCISES

How many edges and corners for each?

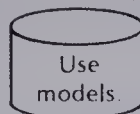


Using the Exercises

- Work through the questions with the students. After the exercises are done, ask the students to identify solids by verbal descriptions. Which solid has 12 edges and 8 corners? *Cube* One edge and one corner? *Cone* No edges and no corners? *Sphere* 2 edges and no corners? *Cylinder* 9 edges and 6 corners? *Triangular prism* 8 edges and 5 corners? *Pyramid*



## PRACTICE



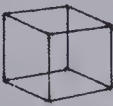

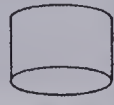
1. Copy and complete the table.

	curved edges	straight edges	corners
cube	0	12	8
cone	1	0	1
cylinder	2	0	0
pyramid	0	8	5

2. Which solid above has the most edges? cube
3. Which solid above has the fewest corners? cylinder
4. Which 4 skeletons can be made with straws and Plasticine?  
cube, pyramid, box, prism

## REVIEW

- G4 1. Draw a picture of a line segment and two endpoints.

			
G5 Name.	2. <u>cube</u>	3. <u>cone</u>	4. <u>cylinder</u>
G6 Number of faces.	5. <u>6</u>	6. <u>1</u>	7. <u>2</u>
G7 Number of edges.	8. <u>12</u>	9. <u>1</u>	10. <u>2</u>
Number of corners.	11. <u>8</u>	12. <u>1</u>	13. <u>0</u>

209

## Assigning the Practice

Minimum: 1  
Average: 1-4  
Enriched: 1-4

## Review Exercises

Questions	Objective	Pages
1	G4	202-203
2-4	G5	204-205
5-7	G6	206-207
8-13	G7	208-209

## Reinforcement

### Geometry 17 Workcard

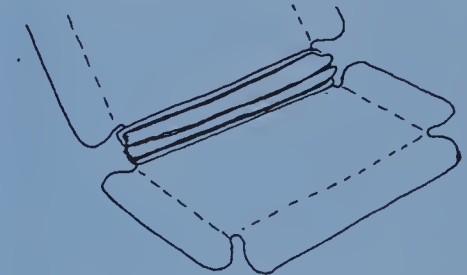
Solids

- Find the length of each edge of a box.
- On paper, trace along the edges of the box. Write the lengths of the edges.

### Geometry 18 Workcard

Solids

Use cardboard figures and elastic bands to make shells of solids.



## Enrichment

### Geometry 19 Workcard

Solids

Make a toothpick sculpture.  
Write a short story about it.

### Geometry 20 Workcard

Solids

Make a skeleton of a bridge that crosses over a book without touching it.

## Extra Practice

## Worksheet G7

Pages 208-209

Fill in the blank with the best word.

- A can has two curved edges.
- A square has 4 sides. A cube has 12 edges.
- A ball has 0 edges and no corners.
- A box has 8 corners.
- A cone has one curved edge.

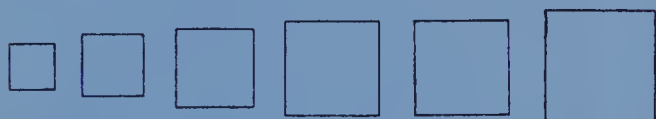
curved    ball    corners    edges    can

## Objective G8

Identify similar and congruent figures.

### Introducing the Lesson

Prepare 6 squares, 6 equilateral triangles, and 2 scalene triangles. Two squares and two triangles should be congruent. Display the squares and ask, "Which of these look equal?" Determine that the "equal" squares are the **same shape and the same size**. Classify the other squares as the same shape but smaller, or the same shape but larger. "All squares have the same shape."



Show how congruence (same shape and size) can be checked by tracing a figure on tracing paper.

Repeat the above procedure for the equilateral triangles. Then ask, "Do all triangles have the same shape?" After some discussion, show the scalene triangles and conclude that not all triangles have the same shape.

### Teaching the Lesson

Have the pupils read and discuss the presentation on page 210. Focus on the concept of *same shape*.

To review and study the terminology, have the students cover the answers on page 210 with their exercise books. Show them how to check their understanding and memory.

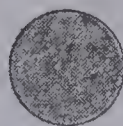
Let the pupils explain how counting can prove these figures have different shapes. (They can count edges or corners).



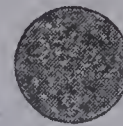
Determine that comparing the number of sides of two figures can show that the figures have different shapes, but cannot show that the figures have the *same shape*.



## Same Size and Same Shape



same shape



same size and shape



different



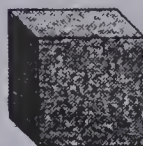
same shape



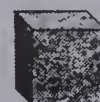
different



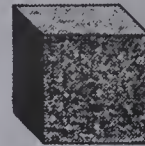
same size and shape



different



same shape



same size and shape

### EXERCISES

Write **different**, **same shape**, or **same size and shape**.



1. same shape

2. same size and shape

3. different



4. different

5. same size and shape

6. same shape



7. same shape

8. different

9. same size and shape



10. same size and shape

11. different

12. different

### Using the Exercises

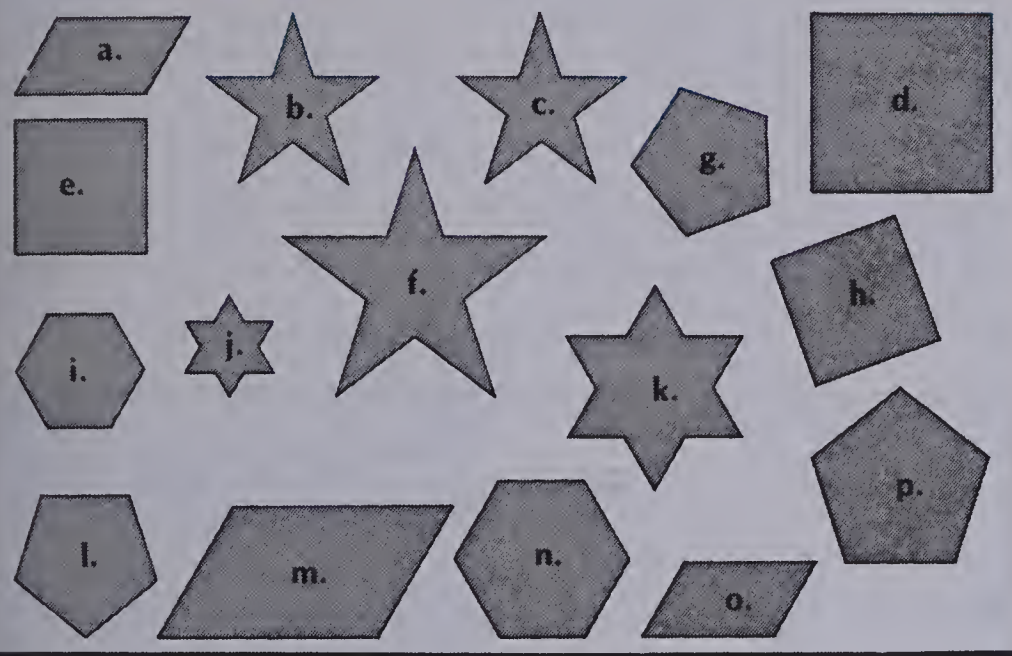
- The exercises are arranged in groups of three. The students compare each of three figures or solids to the one given on the left. It may help to go through each question and have the students identify each figure or solid before doing the comparison. For example, make sure they realize that the picture in question 3 represents a circle, not a sphere, because it does not have three-dimensional shading. Make sure they are properly distinguishing plane figures from solids.
- It may be necessary to explain (and demonstrate) that position does not affect size and shape, as in questions 5 and 6 where the rectangles are shown horizontally while the original figure is vertical.



## PRACTICE

Write different, same shape, or same size and shape.

1. a and o *same size and shape*
2. b and f *same shape*
3. b and c *same size and shape*
4. e and h *same size and shape*
5. f and k *different*
6. o and h *different*
7. i and n *same shape*
8. g and p *same shape*
9. g and l *same size and shape*
10. j and k *same shape*
11. i and l *different*
12. m and o *same shape*



## Try to Cover Me!

Can you cover the lizard with these objects?

1. checkers
2. dominoes
3. diamonds



*no*



*yes*



*yes*

Rules: No objects overlap.  
All of the lizard is hidden.



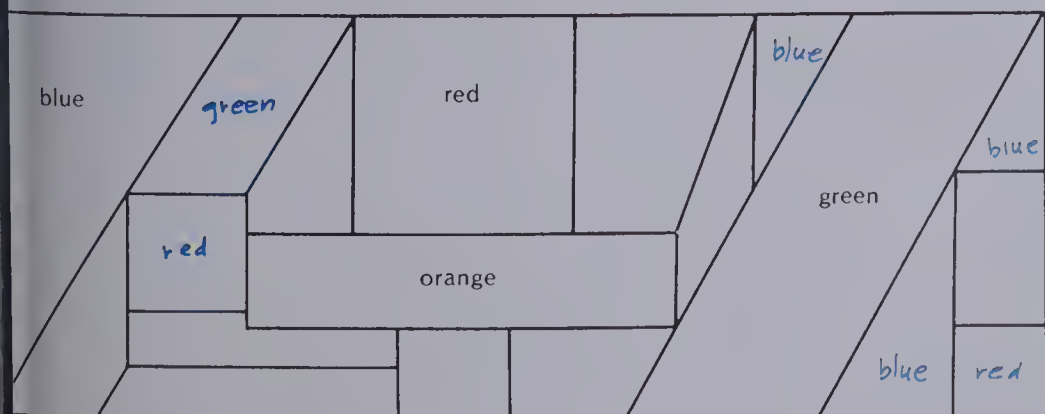
211

## Extra Practice

Colour figures with the same shape.

## Worksheet G8

Pages 210-211



## Assigning the Practice

Minimum: 1-6

Average: 1-12

Enriched: 1-12

## Reinforcement

Introduce "Shape Concentration" consisting of 20 playing cards with pairs of two sizes for the following figures: squares, rectangles, triangles, circles, and pentagons.

### Geometry 21 Workcard

Shape

Play "Shape Concentration" with a friend.

## Enrichment

Establish a print making centre. Provide materials for potato prints and Plasticene prints. Discuss various types of repeating patterns.

### Geometry 22 Workcard

Shape

Work in the print making centre.

1. Make a simple repeating pattern.



2. Make a different kind of repeating pattern.

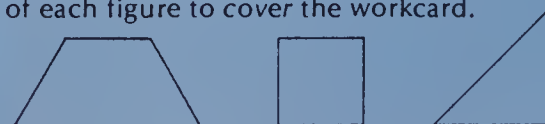


Provide a collection of checkers, dominoes, and diamonds for the exercise Try to Cover Me! at the bottom of page 211.

### Geometry 23 Workcard

Shape

1. Trace these figures 10 times on cardboard. Cut out the sets of figures.
2. Show someone you can use copies of each figure to cover the workcard.



## Objective GR2

Use a number pair to name a location on a grid.

## Introducing the Lesson

Construct a 4 by 4 grid (without numbers) on square floor tiles. Place objects on the following tiles: (2, 3), (4, 2), and (3, 1). Ask the students to try to describe the location of each object to someone over the telephone. The discussion that arises may be very fruitful in motivating the solution. Together, decide to number the grid in the way illustrated on page 212. Prepare these labels for the locations of the objects.

2 → , 3 ↑    4 → , 2 ↑    3 → , 1 ↑

Have someone suggest a meaning for the arrows on the labels. Help lead the students to associate the numbers along the horizontal and vertical axes with the number of squares right and up.

## Teaching the Lesson

Decide to drop the arrows to simplify what is to be written. Have the students practise translating between the two forms: 2 → , 3 ↑ becomes (2, 3).




Make cards to label all 16 squares on the 4 by 4 grid with number pairs. Then scramble the cards and ask the students to replace the labels on the grid.

4	(1, 4)	(2, 4)	(3, 4)	(4, 4)
3	(1, 3)	(2, 3)	(3, 3)	(4, 3)
2	(1, 2)	(2, 2)	(3, 2)	(4, 2)
1	(1, 1)	(2, 1)	(3, 1)	(4, 1)
	1	2	3	4

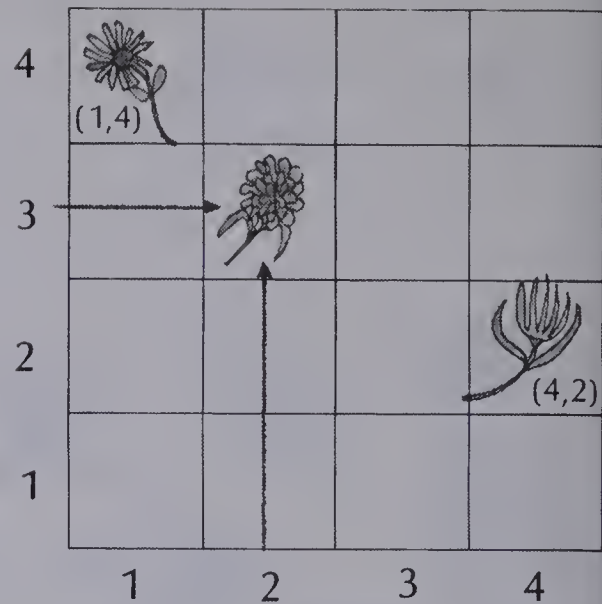
Challenge the pupils to find number patterns on the labelled grid. For example, the labels in a column have the same first number as that found at the bottom of the grid. Similarly, the labels in a row have the same second number as that found at the left of the row. Lead the students to conclude that it is possible to name any square by using the numbers below and on the left.

# Grids

Renée is displaying her paper flowers.

The  is hooked  and 

She names this square with the pair (2,3).



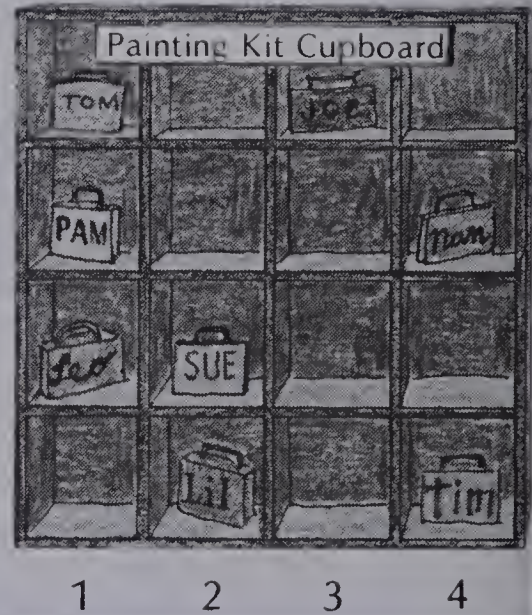
## EXERCISES

Whose painting kit?

- (2,1) Lil
- (1,4) Tom
- (1,2) Leo
- (4,1) Tim
- (1,3) Pam
- (4,3) Nan

Name the pair.

- Pam (1,3)
- Joe (3,4)
- Lil (2,1)
- Sue (2,2)
- Tim (4,1)
- Leo (1,2)
- Nan (4,3)
- Tom (1,4)



## Using the Exercises

- Questions 1 to 6 require the students to find the correct square given the number pair. Make sure they read across first, then up.
- Questions 7 to 14 require the students to find a square and then name it by a number pair. They must reverse the earlier process by looking down the column to find the number at the bottom, and then looking across the row to find the number at the side.



## PRACTICE

Who sits at the desk?

1. (3,5) *Sara* 2. (2,4) *Rick*
3. (1,2) *Lil* 4. (1,3) *Nan*
5. (4,2) *John* 6. (3,3) *Art*

Name the pair.

7. Amos (3,2) 8. Jim (4,1)
9. Rick (2,4) 10. Tom (1,5)
11. Andy *not in the class* 12. Vera (1,1)
13. John (4,2) 14. Taro (4,4)
15. The points in column 2.  
(2,1) (2,2) (2,3) (2,4) (2,5)

5	Tom	Sue	Sara	Pete
4	Mike	Rick	Ruth	Taro
3	Nan	Jill	Art	Phil
2	Lil	Tim	Amo	John
1	Vera	Mary	Kate	Jim
	1	2	3	4

column

## Assigning the Practice

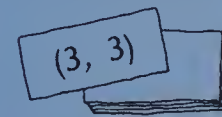
Minimum: 1-6

Average: 1-14

Enriched: 1-15

## Reinforcement

Set up a two-person grid game called "Three in a Row". One player gets 8 red bingo chips and the other gets 8 white bingo chips. In turn, a number pair is drawn from a deck. The player must play a chip on the correct square or forfeit the turn. The first person to get three chips in a row in any direction is the winner.



Red wins.

○	●	●	
	●	○	
●	○	○	

### Geometry 24 Workcard

Play "Three in a Row" with a friend.

Grids

## Enrichment

After assigning City Sites at the bottom of page 213, provide a grid and materials to make a model of a town. Encourage the students to compose their own directions for a city tour.

### Geometry 25 Workcard

Tell about a path through your model town that would be interesting. Use the words north, south, east, and west.

Grids

### Geometry 26 Workcard

The path from (1, 3) to (4, 2) is 5 squares long.

4				
3	■	■	■	
2			■	
1				
	1	2	3	4

Can you make a path from (1, 3) to (4, 2):

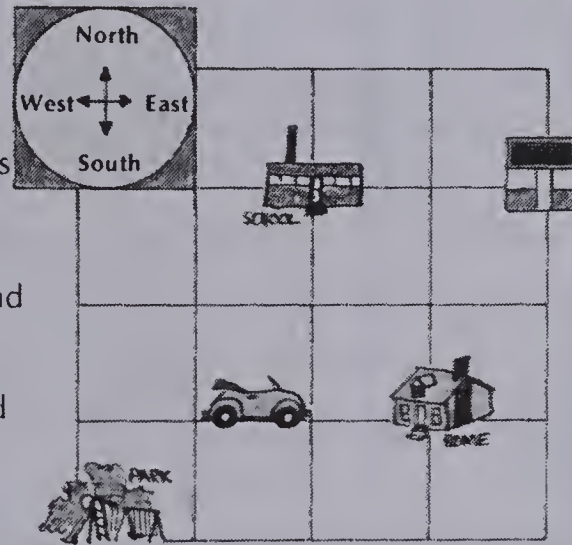
1. that is 7 squares long?
2. that is 9 squares long?
3. that is 8 squares long?

Grids

## City Sites

Tell where you visit.

1. From **home** go east 1 block and north 2 blocks. *store*
2. Then go west 2 blocks. *school*
3. Next go south 3 blocks and west 2. *park*
4. Then go north 1 block and east 3. *home*
5. Write an interesting story about the city sights.



213

## Extra Practice

Colour the grid as shown.

- ue (1, 3) (2, 4) (4, 1)  
d (1, 4) (3, 1) (4, 2)  
een (1, 2) (3, 2) (3, 4)  
ange (2, 1) (2, 3) (4, 3)  
own (1, 1) (3, 3)  
llow (2, 2) (4, 4)

4	red	blue	green	yellow
3	blue	orange	brown	orange
2	green	yellow	green	red
1	brown	orange	red	blue
	1	2	3	4

## Worksheet GR2

Pages 212-213

## Objective G9

Perform slides of figures on grids.

### Introducing the Lesson

On a 4 by 4 floor grid, place an object at (3, 2). Then slide the object left 2 squares and up 1 square so that it comes to rest at (1, 3). Ask the students to describe the slide in words as you slowly repeat the movement.

Repeat this procedure, but allow students to choose the horizontal and vertical slides. Be careful that the object is not turned or flipped while being manipulated.

### Teaching the Lesson

Now, using objects, show an initial position and a final position but don't actually show the slide. Have students determine the description of a slide that would have these positions. Encourage them to mention the horizontal (back and forth) movement before the vertical (up and down) movement (e.g., 3 left and 1 down).

Introduce the game "Catch Up with Relish". (See the Reinforcement.) Demonstrate the game with two students on a 4 by 4 floor grid.

Read and discuss the introduction on page 214.

Make 2 transparencies of the grids at the top of page 214. Cut the squares containing the pictures out of one of the transparencies. Use the overhead projector and either the teacher or a student can illustrate the slides of figures on the grids.

(The cut-out square with a picture should be placed directly over the appropriate picture on the complete transparency. Then the cut-out picture can be moved to illustrate the slide.)

## Slides on a Grid



Tina changed her grid-picture by sliding.

The has moved **right 2** spaces to (4,2).

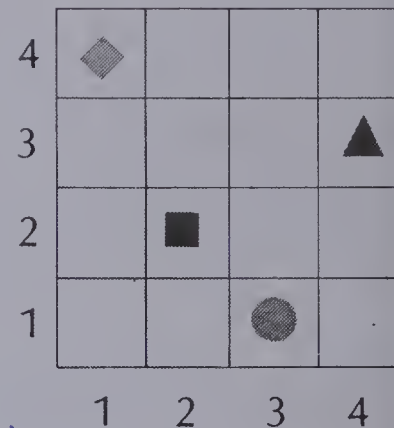
The has moved **down 2** spaces to (1,1).

The sun slid **left 1** and **up 1**.

### EXERCISES

Where is it after the slide?

- Slide **up 3**. (3,4)
- Slide **right 1**. (3,2)
- Slide **left 3**. (1,3)
- Slide **down 2**. (1,2)
- Slide **right 1 and up 1**. (4,2)
- Slide **left 1 and up 1**. (1,3)
- Slide **left 1 and down 1**. (3,2)
- Slide **right 1 and down 1**. (2,3)







### Using the Exercises





- Questions 1 to 4 are simple vertical or horizontal slides. Make sure the students are not having directional problems before proceeding with the balance of the exercises and practice.
- Questions 5 to 8 require two slides each, first a horizontal slide and then a vertical slide.



## PRACTICE

Where is the bird after the slide?

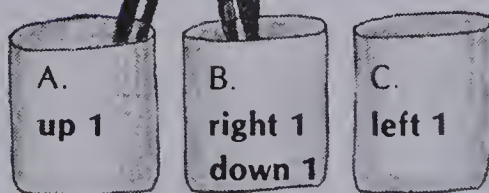
1.  moved **down 1**. (4, 3)
2.  moved **left 2**. (1, 2)
3.  **right 1** and **up 1**. (4, 3)
4.  **left 3** and **down 3**. (1, 1)
5. Redraw the grid-picture with these changes.

 **left 2**    **up 2**  
 **right 1** and **down 1**  
 **right 2** and **up 1**



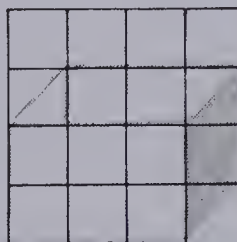
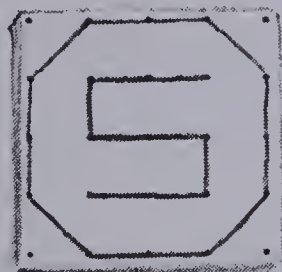
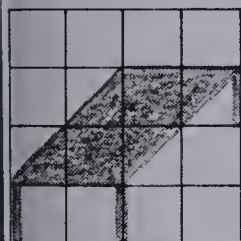
What kind of slide? Match.

6. Move from (3,3) to (2,3). **C**
7. Move from (3,3) to (3,4). **A**
8. Move from (3,3) to (4,2). **B**



## Making EnLARGEments

Copy each picture on a larger grid.



215

## Extra Practice

Slide and print these words on the grid.

- blue: right 3  
 green: down 2  
 brown: left 2, down 2  
 orange: right 2, up 1  
 purple: left 1, up 3  
 red: left 1, up 1

Now colour each square with its new name.

4	blue	purple	brown	blue
3	red	green	red	green
2	brown	red	orange	red
1	orange	green	purple	green
	1	2	3	4

## Worksheet G9

Pages 214-215

## Assigning the Practice

Minimum: 1-4

Average: 1-5

Enriched: 1-8

## Reinforcement

To play "Catch Up with Relish" each player places a different-coloured marker on a 6 by 6 grid. In turn, the players draw a *slide instruction card* and slide their marker according to the slide directions. A player completes as much of a slide instruction as feasible; if the player's marker collides into the boundary of the grid, then the slide is terminated at that square prior to the collision. Upon intercepting an opponent's marker, that marker is removed from the grid. The object of the game is to have the last marker on the grid. (This is not a game of skill.)

**Geometry 27 Workcard**  
 Play "Catch Up with Relish".

Grids

**Geometry 28 Workcard**  
 Look at the grid designs on the back of this workcard. Copy the designs on a geoboard.

Grids

## Enrichment

1. Assign *Making EnLARGEments* at the bottom of page 215. Grids and dot paper may be duplicated from the masters supplied at the beginning of this unit.

2. Introduce students to a simplified game of chess by removing the queen and bishops. Particularly relate the movement of the knight with slides on grids.

### Objective PS19

Sort and classify solids.

### Introducing the Lesson

Use models of solids and ask the pupils to sort them into small groups that are alike in some way. Ask how the items in each group are the same and how they are different.

#### Examples

cube, box

Alike: same number of faces, edges

Different: box doesn't have all square faces

pyramid, prism

Alike: corners, same triangle faces

Different: pyramid has more triangles

cone, cylinder

Alike: circular faces

Different: cylinder has an extra circle

### Teaching the Lesson

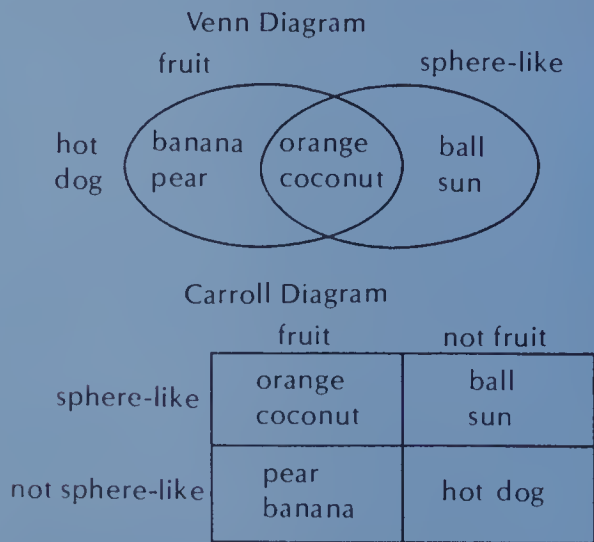
Using geometric models, practise two-step sorting with these examples.

Triangles are terrific. (pyramid or prism)  
I have more than 2.  
Who am I? (pyramid)

Square faces are possible. (cube, pyramid, prism, box)  
I have more than 2 but not 6.  
Who am I?  
(not cube or pyramid; not a box; a prism)

### Reinforcement

The Venn and Carroll diagrams are quite useful for classifying objects. With both cases, objects are placed in one region if they have a certain property, and in a different region if they don't. Most Grade 3 students are able to work with diagrams involving 2 properties.



## Sorting



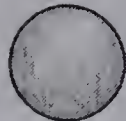
cone



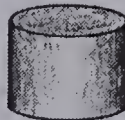
cube



pyramid



sphere



cylinder



prism



box

- Triangle faces  
Five corners  
Who am I? *pyramid*
- Rolls straight  
Two faces  
Who am I? *cylinder*
- Eight corners  
A special box  
Who am I? *cube*
- One round surface  
One curved edge  
Who am I? *cone*
- No edges  
No corners  
Who am I? *sphere*
- Five faces  
Looks like a tent *prism*  
Who am I? *(or pyramid)*
- List the solids that have curved edges.  
*cone, cylinder*
- List the solids that have from 2 to 5 faces.  
*pyramid, prism, cylinder*
- Which solid is in both lists?  
*cylinder*
- Which solids are in neither list?  
*sphere, cube, box*



### Problem Solving Activities

Assign Level 3, Unit 11.



# Geometry Report

Make a report for each shape.



## Ideas

- Count the number of sides.
- Find several lines of symmetry.
- Try to **cover** a page with each.
- Which have you seen before? Where?

REVIEW

Write **different**, **same shape**, or **same size and shape**.

GR8

1. 

same size and shape

2. 

different

3. 

different

GR2

4. Name the blue dot. (1,3)

5. What colour is (3,2)? red

Name the new pair.

6. Slide right 2. (3,1)

7. Slide left 2 (1,2) and down 1.

GR9

3			
2			
1			
	1	2	3

217

## Extra Practice

- List the solids with corners.  
*cone, cube, pyramid, box, prism*
- List the solids with less than 6 faces.  
*cone, pyramid, cylinder, prism*
- Which solids are in both lists?  
*cone, pyramid, prism*
- Which solids are in neither list?  
*sphere*

## Worksheet PS19-PS20

Pages 216-217

## Objective PS20

Summarize information in a report.

## Introducing the Lesson

Establish the reporting standards for this independent activity in terms of length, neatness, title, illustrations, style of writing.

## Teaching the Lesson

With the students analyse the following example of a report on squares. Make a brief outline of the contents. Assign each student a plane or solid figure on which to report. Allow the students to display and discuss their work.

### Squares

All squares have the same shape but can have different sizes. Squares have 4 equal sides. They also have 4 lines of symmetry. Since squares are like tiles, they can easily cover the page. Floor and ceiling tiles are square. Geoboards are square, too.

## Review Exercises

Questions	Objective	Pages
1-3	G8	210-211
4-5	GR2	212-213
6-7	G9	214-215

217

Unit 11 Objective	Test Questions	Pages
G4	1	202-203
G5	2-5	204-205
G6	6-8	206-207
G7	9-11	208-209
G8	12-14	210-211
GR2	15-18	212-213
G9	19-20	214-215

# TEST

# UNIT 11

1. Draw two line segments that intersect.



Name the solid.

2. sphere 3. cube 4. cone 5. cylinder

Count the faces.

6. 8 7. 5 8. 5

How many **edges**? How many **corners**?

9. box <sup>12</sup>/<sub>8</sub> 10. cylinder <sup>2</sup>/<sub>0</sub> 11. sphere <sup>0</sup>/<sub>0</sub>

Write **different**, **same shape**, or **same size and shape**.

12. different 13. same shape 14. same size and shape

15. What figure is at (3,1)? red ■

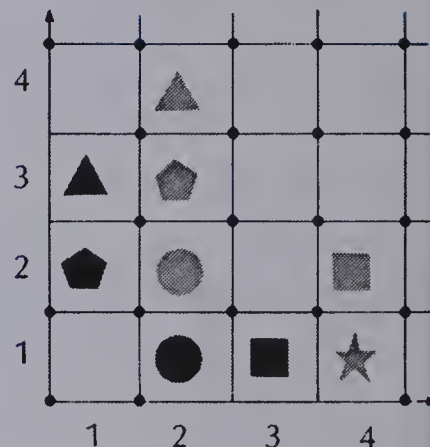
16. What figure is at (1,3)? red ▲

17. Where is ★? (4,1)

18. Where is ■? (1,2)

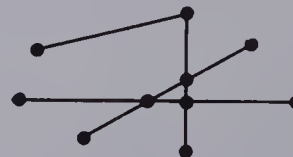
19. Slide ■ up 3. Where is it now? (3,4)

20. Slide ★ left 3 and up 2. Where is it? (1,3)



## Post-test

1. How many intersection points? 4



Name each solid.

2. can 3. box 4. cone 5. pyramid

How many faces?

6. 5 7. 2 8. 6



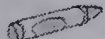

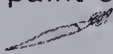
How many edges and corners?

9. pyramid: 8 edges and 5 corners.  
10. cone: 1 edges and 1 corners.





## PROBLEM SOLVING

Solve.

1. 524   
393 like art.  
How many do not? 131
2. 42 crayons  
7   
How many for each? 6
3. 335   
186   
How many in all? 521
4. 8 paint cans  
7  in each can.  
How many brushes in all? 56
5. 95 paint cans  
279 paint brushes  
54 math books  
How many for painting? 374
6. 375 crayons in a box  
66 taken by teachers.  
192 taken by students.  
How many are left? 117

### PAINTING

A class of 30 children painted solids.  
The painting began at 10:20. The children painted 168  and 83 .  
Five children each used 3 cans of water. Everyone else used 1 can each. The painting time lasted 30 minutes.

7. How many solids were painted? 251
8. How many cans of water did the 5 children use in all? 15
9. How many students painted? 30
10. At what time was the painting done? 10:50
11. How many cans of water were used by the class? 40

219

11. cube: 12 edges and 8 corners.

Write **different**, **same shape**, or **same size and shape**.

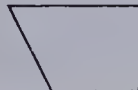


12.



same shape

13.



same size and shape

14.





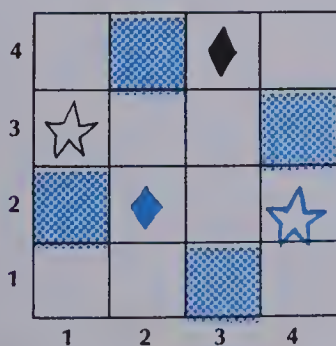
different

Colour the square.

15. (3, 1)
16. (2, 4)
17. (1, 2)
18. (4, 3)

Draw in the new square.

19. Slide  right 3, down 1.
20. Slide  left 1, down 2.



# UNIT 12

## Multiplication Facts II

Theme: Collections

Lesson		Objective	Vocabulary	Materials
Preview		Multiply with 2, 3, 4, and 5 as factors in horizontal form.	factor, product, multiply, multiplication	
1	A45	Multiply in vertical form with products to 45.	horizontal, vertical, read across, read up, rows	
2	A46	Multiply with 6 as one of the factors.	distribute or divide, 6 times table	multiplication wall chart
3	A47	Multiply with 7 as one of the factors.	distribute or divide, 7 times table	multiplication wall chart
4	GR3	Interpret and construct pictographs.	pictograph	hockey cards (or other cards)
5	A48	Multiply with 8 as one of the factors.	8 times table	multiplication wall chart, flash cards for 8 times table
6	A49	Multiply with 9 as one of the factors.	9 times table	multiplication wall chart, flash cards for 9 times table
7	M15	Measure area using non-standard units and square centimetres.	area, unit, square centimetres, cover	paper clips, erasers, rulers, cards, dominoes, checkers, pencils, etc.
8	M16	Use multiplication to find the area of a rectangle.		rectangles on grids, centimetre square grids.
Test		Multiplication facts with products to 81		
Review		Subtraction of 3 digits from 3 digits with regrouping		



# About This Unit

The primary purpose of Unit 12 is to extend the students' understanding of the multiplication concept introduced in Unit 7 by developing the multiplication facts with factors of 6, 7, 8, and 9. Many of these facts will have been encountered in Unit 7 because of the order or commutative property. For example,  $7 \times 3$  should be known from  $3 \times 7$ . However, in Unit 12 the strategy employed to solve these more difficult facts is the distributive property of multiplication over addition, which was introduced in Unit 7 for the 4 times tables.

The rationale for using this strategy is based on the importance of organizing information to form relationships, thus making it more coherent and retrievable. Therefore, the larger, unknown facts are distributed into smaller, known facts. For example,  $6 \times 7$  can be distributed into 5 sevens + 1 seven. Although the pupil pages show only one way to distribute a particular factor, it is hoped that you will demonstrate to your students various ways to indicate the variety of distributions possible.

With  $6 \times 7$ , two other distributions are possible, namely 3 sevens + 3 sevens and 2 sevens + 4 sevens.

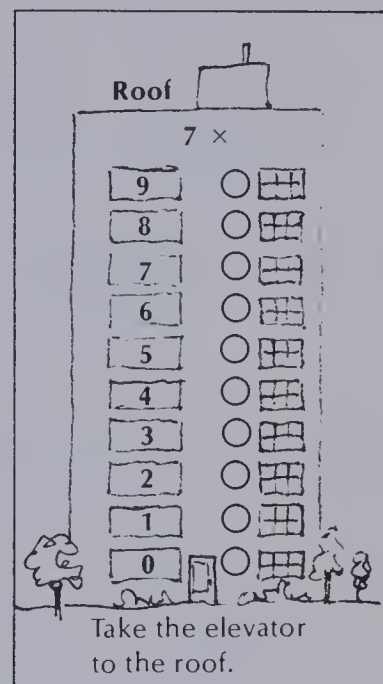
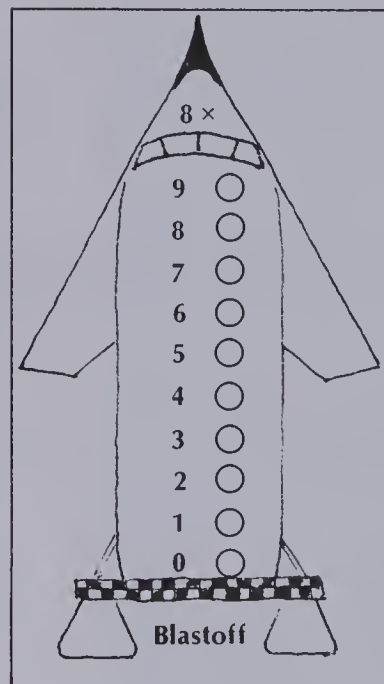
A secondary purpose of Unit 12 is the mastery of the multiplication facts for products to 81. Students are expected to memorize the facts soon after they demonstrate an understanding of the multiplication sentence. Therefore, a drill program should be ongoing throughout the teaching of this unit. As new facts are understood, they should be added to the drill program. See the *Ideas* section below for a detailed description of a drill program.

## Ideas

The theme of Unit 12 is *Collections*. The following activities include some ideas for creating an atmosphere in the classroom based on student collections. Also, practice ideas and a drill program are suggested.

1. Organize a "Collections Corner". Stock the centre with books, pictures, and suggestions for things to collect, focusing on items of interest to the students.

2. Have a sharing time for the students to tell about and display their own collections in the corner.
3. Discuss how collections can develop into life-long hobbies (baseball cards, rocks and gems, dolls, stamps, coins). Encourage students having the same collections to share information and even trade items.
4. Prepare practice cards like the following.



- Punch holes beside each number. Write the products on the back.
  - One player puts a pencil in each hole, reads the question, and tells the product.
  - The other player checks the answer on the back where the pencil is.
5. Conduct a drill program similar to the one outlined in the *Ideas* section for Unit 7. Provide a Multiplication Fact Master Card for students that did not start one in Unit 7.

$\times$	0	1	2	3	4	5	6	7	8	9
1										
2										
3										
4										
5										
6										
7										
8										
9										

Also, provide 20 self-checking quizzes of 25 problems each. The first 5 should include the 0 to 5 times tables. The last 15 should include the 2 to 9 times tables. Allow 75 seconds per quiz (no more than 3 seconds per question). Students record their results on the Fact Master in the following way:

- 1st time correct — light shading
- 2nd time correct — dark shading
- 3rd time correct — sticker

Getting no mistakes means the student may take the next quiz in the sequence. Emphasize to students that this is not a competition with other students, but rather a competition with oneself.

Encourage students to study the facts they don't know at home. Be patient. Remember some students can commit things to memory with only 15 exposures, but others may require up to 60 exposures.



Unit 12 Objective	Test Questions	Pages
A45	1-8	222-223
A46	9-16	224-225
A47	17-24	226-227
A48	25-32	230-231
A49	33-40	232-233

### Pretest

Multiply.

1.  $3 \times 5 = 15$

2. 
$$\begin{array}{r} 5 \\ \times 3 \\ \hline 15 \end{array}$$

3.  $6 \times 2 = 12$

4. 
$$\begin{array}{r} 2 \\ \times 6 \\ \hline 12 \end{array}$$

5.  $4 \times 8 = 32$

6. 
$$\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$$

7.  $5 \times 5 = 25$

8. 
$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

9. 
$$\begin{array}{r} 4 \\ \times 6 \\ \hline 24 \end{array}$$

10. 
$$\begin{array}{r} 6 \\ \times 8 \\ \hline 48 \end{array}$$

11. 
$$\begin{array}{r} 6 \\ \times 9 \\ \hline 54 \end{array}$$

12. 
$$\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$$

13. 
$$\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$$

14. 
$$\begin{array}{r} 6 \\ \times 7 \\ \hline 42 \end{array}$$

15. 
$$\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$$

16. 
$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

17. 
$$\begin{array}{r} 7 \\ \times 4 \\ \hline 28 \end{array}$$

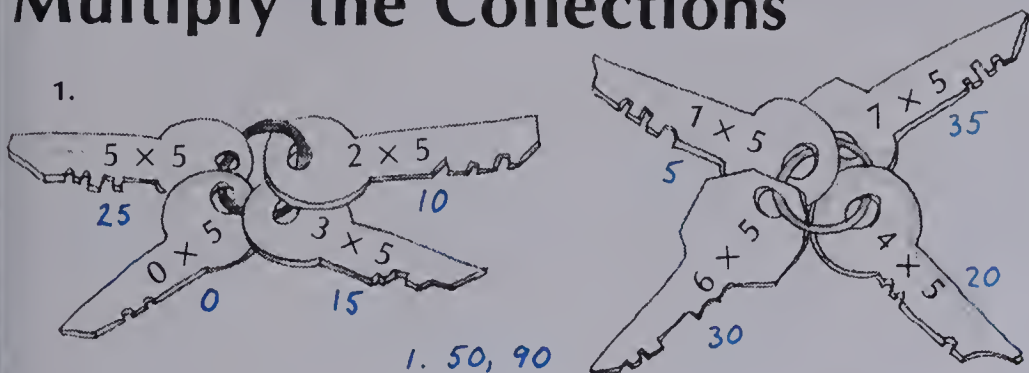
18. 
$$\begin{array}{r} 7 \\ \times 5 \\ \hline 35 \end{array}$$

Unit 12

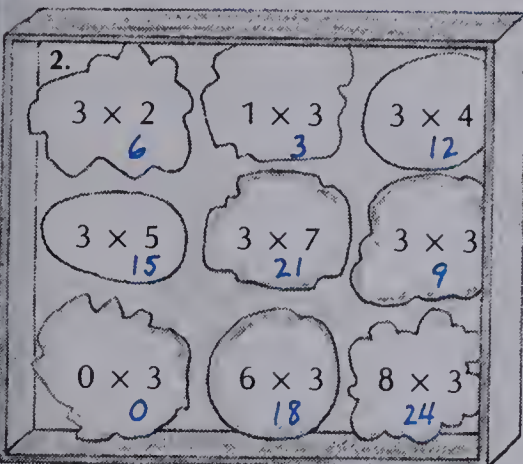


# Multiply the Collections

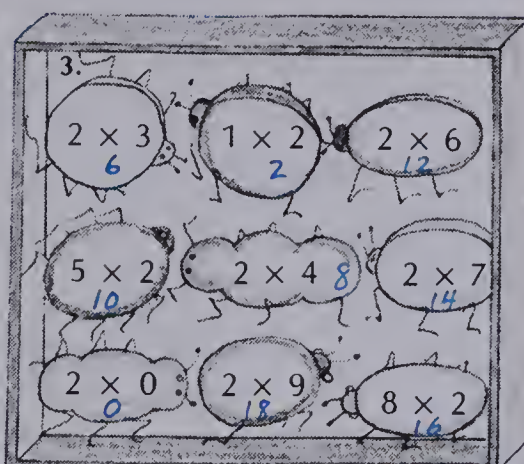
1.



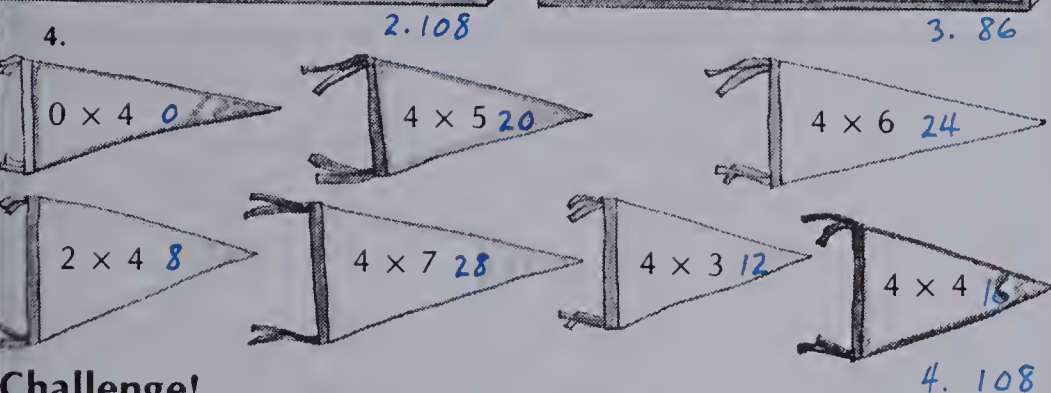
2.



3.



4.



## Challenge!

Add the products in each collection.

Which two collections have the same sum? **2, 4**

221

# UNIT 12 PREVIEW

## Suggestions

Looking together at page 220, ask the students what collections are displayed, what collections they may have that are the same or different from those pictured and those being discussed. Let them talk about trading collections, their collections, and so on.

Review the vocabulary from Unit 7: multiply, multiplying, times, factor, product, groups of.

Review the 2, 3, 4 and 5 times tables for products to 45. If the students do not recall the products, demonstrate how to solve the multiplication through:

- repeated addition:  $2 \times 7 = 7 + 7 = 14$
- skip counting:  $3 \times 4 = 3 \text{ fours} = 4, 8, 12$
- groups of counters:  $3 \times 5 = \text{three groups of five} = 15$

To review the order or commutative property, ask the students to match the following:  $4 \times 6$ ,  $3 \times 4$ ,  $2 \times 7$ ; and  $4 \times 3$ ,  $6 \times 4$ ,  $7 \times 2$ .

## About the Page

Have each student divide a notebook page into 4 columns and write the products only of each collection in the columns.

As an added challenge, tell them that two collections have the same sum when their products are added. Which collections are they? (Collections 2 and 4 each have a sum of 108.)

## Reinforcement

1. If not started in Unit 7, introduce the Multiplication Fact Master described in the Ideas sections of Units 7 and 12.

2. Prepare a worksheet with the 2, 3, 4, and 5 times tables in random order (40 questions). Time how long it takes the students to complete it. This will indicate who still needs to practise the facts to 45. The goal is to answer the sheet in 2 minutes (3 seconds per question). If some take longer than 4 minutes, they are not ready for the drill program. They need more work on how to solve the questions.

19. $\begin{array}{r} 9 \\ \times 7 \\ \hline 63 \end{array}$	20. $\begin{array}{r} 0 \\ \times 7 \\ \hline 0 \end{array}$	21. $\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$	22. $\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$	23. $\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$
24. $\begin{array}{r} 4 \\ \times 7 \\ \hline 28 \end{array}$	25. $\begin{array}{r} 3 \\ \times 8 \\ \hline 24 \end{array}$	26. $\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$	27. $\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \end{array}$	28. $\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$
29. $\begin{array}{r} 1 \\ \times 8 \\ \hline 8 \end{array}$	30. $\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$	31. $\begin{array}{r} 5 \\ \times 8 \\ \hline 40 \end{array}$	32. $\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$	33. $\begin{array}{r} 4 \\ \times 9 \\ \hline 36 \end{array}$
34. $\begin{array}{r} 0 \\ \times 9 \\ \hline 0 \end{array}$	35. $\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array}$	36. $\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \end{array}$	37. $\begin{array}{r} 7 \\ \times 9 \\ \hline 63 \end{array}$	38. $\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$
39. $3 \times 9 = 27$	40. $9 \times 9 = 81$			

Objective A45

Multiply in vertical form with products to 45.

Introducing the Lesson

Draw the following arrays on the chalkboard.

$\times \times \times \times \times \times$        $\bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc$   
 $\times \times \times \times \times \times$        $\bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc$   
 $\times \times \times \times \times \times$

Ask for the multiplication sentences to tell how many in all. Write them under each drawing and read them aloud.

$3 \times 6 = 18$        $2 \times 7 = 14$

Explain that this is the horizontal or “across” way to write a multiplication sentence. Read them across from left to right.

Teaching the Lesson

Explain that another way to write the same thing is the up-and-down, or **vertical** way. For example,

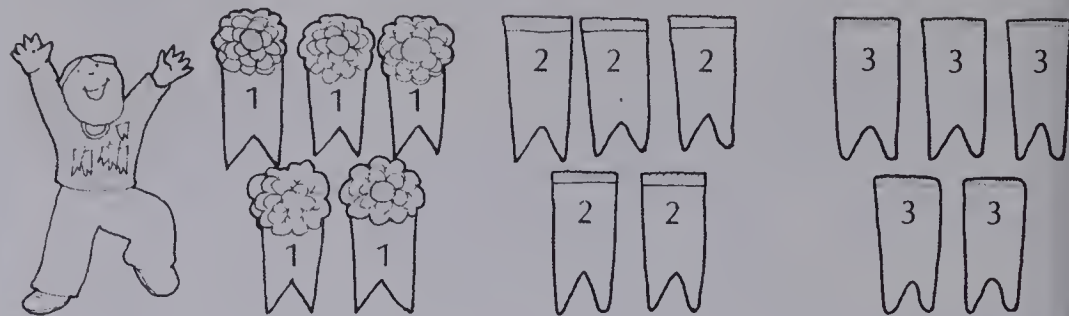
$\begin{array}{r} 6 \\ \times 3 \\ \hline \end{array}$        $\begin{array}{r} 7 \\ \times 2 \\ \hline \end{array}$

Read these up from bottom to top. Tell the students that although the product is the same whether the sentence is read up or down, we will always read up to make future multiplication questions easier to understand.

Direct the students to the top of page 222 to discuss another example of horizontal and vertical multiplication sentences.

Another Way to Multiply

Find how many ribbons Craig won.



Craig won 3 groups of 5 ribbons.

There are two ways to write 3 times 5.

$3 \times 5 = 15$   
Read across

$\begin{array}{r} 5 \\ \times 3 \\ \hline 15 \end{array}$   
Read up

The **product** is 15.

Craig won 15 ribbons in all.

EXERCISES

Multiply.

1.  $2 \times 3 = 6$



2.  $3 \times 2 = 6$

$\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array}$

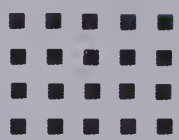
3.  $3 \times 4 = 12$



4.  $4 \times 3 = 12$

$\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$

5.  $4 \times 5 = 20$



4 rows of 5

6.  $5 \times 4 = 20$

$\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$

7.  $3 \times 7 = 21$



3 rows of 7

8.  $7 \times 3 = 21$

$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$

Using the Exercises

- Before assigning the questions 1 to 8, ask the students to read aloud each multiplication sentence and to tell what the four pictures mean.



## PRACTICE

Multiply.

1.  $3 \times 0 = 0$
2. 
$$\begin{array}{r} 3 \\ \times 0 \\ \hline 0 \end{array}$$
3.  $4 \times 4 = 16$
4. 
$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$
5.  $2 \times 8 = 16$
6. 
$$\begin{array}{r} 8 \\ \times 2 \\ \hline 16 \end{array}$$
7.  $1 \times 5 = 5$
8. 
$$\begin{array}{r} 5 \\ \times 1 \\ \hline 5 \end{array}$$
9. 
$$\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$$
10. 
$$\begin{array}{r} 7 \\ \times 4 \\ \hline 28 \end{array}$$
11. 
$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$
12. 
$$\begin{array}{r} 2 \\ \times 3 \\ \hline 6 \end{array}$$

Complete each multiplication question.

13.  $\blacksquare \times 8 = 32$   
4
14. 
$$\begin{array}{r} 8 \\ \times \blacksquare 4 \\ \hline 32 \end{array}$$
15.  $\blacksquare \times 3 = 24$   
8
16. 
$$\begin{array}{r} 3 \\ \times \blacksquare 8 \\ \hline 24 \end{array}$$
17.  $5 \times \blacksquare = 30$   
6
18. 
$$\begin{array}{r} \blacksquare 6 \\ \times 5 \\ \hline 30 \end{array}$$
19.  $4 \times \blacksquare = 36$   
9
20. 
$$\begin{array}{r} \blacksquare 9 \\ \times 4 \\ \hline 36 \end{array}$$

## Winning Times

Match each problem with the correct multiplication.

Find how many ribbons were won in each problem.

1. 2 students won 5 2nd each.  $5 \times 2 = 10$
2. 1 student won 2 1st.  $2 \times 1 = 2$
3. 3 students won 4 1st each.  $4 \times 3 = 12$
4. 4 students won 2 3rd each.  $2 \times 4 = 8$

$$\begin{array}{r} 5 \\ \times 2 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 2 \\ \times 1 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 2 \\ \times 4 \\ \hline 8 \end{array}$$

223

## Assigning the Practice

Minimum: 1-20

Average: 1-20

Enriched: 1-20

## Reinforcement

1. Assign *Winning Times* at the bottom of page 223.

2. Have a student complete the following table.

$\times$	8	3	6	2	5	1	9	4	0	7
2										
3										
4										
5										

Tell the students who do this to fill in *only* the ones they know from memory and to study the ones they don't know at home. Provide blank flash cards for this purpose.

## Enrichment

1. Ask the students to answer the following.

3 more than  $3 \times 7$

6 less than  $2 \times 6$

2 more than  $4 \times 5$

4 less than  $4 \times 4$

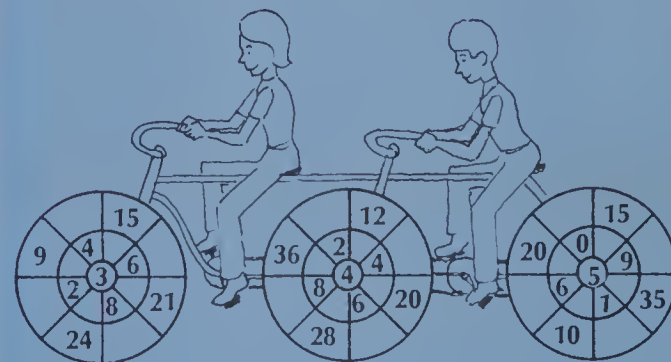
10 more than  $3 \times 5$

10 less than  $5 \times 5$

23 more than  $4 \times 0$

23 more than  $1 \times 3$

2. Multiplication Bike. Provide the following illustration on the chalkboard or on worksheets. Ask the students to fill in the missing numbers on the wheels.



## Extra Practice

## Worksheet A45

Pages 222-223

Multiply.

1.  $4 \times 3 = 12$
2.  $2 \times 8 = 16$
3.  $3 \times 5 = 15$
4.  $3 \times 7 = 21$
5. 
$$\begin{array}{r} 3 \\ \times 4 \\ \hline 12 \end{array}$$
6. 
$$\begin{array}{r} 8 \\ \times 2 \\ \hline 16 \end{array}$$
7. 
$$\begin{array}{r} 5 \\ \times 3 \\ \hline 15 \end{array}$$
8. 
$$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$$
9. 
$$\begin{array}{r} 4 \\ \times 5 \\ \hline 20 \end{array}$$
10. 
$$\begin{array}{r} 9 \\ \times 1 \\ \hline 9 \end{array}$$
11. 
$$\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$$
12. 
$$\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$$
13. 
$$\begin{array}{r} 8 \\ \times 5 \\ \hline 40 \end{array}$$
14. 
$$\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$$
15. 
$$\begin{array}{r} 9 \\ \times 2 \\ \hline 18 \end{array}$$
16. 
$$\begin{array}{r} 7 \\ \times 5 \\ \hline 35 \end{array}$$

Objective A46

Multiply with 6 as one of the factors.

Introducing the Lesson

Write the following on the chalkboard. Ask the students to add in their heads. Write the sums for each as they tell you.

30	40	12	24	21
+ 6	+ 8	+12	+24	+21

Point out that for these sums there was no regrouping. Now ask the students to add these sums in their heads.

35	45	18	27
+ 7	+ 9	+18	+27

Teaching the Lesson

Direct the students to the multiplication wall chart used for Unit 7. The 0 to 5 times tables should be filled in. Ask the students to read aloud the horizontal and vertical rows for the 6 times table that are already filled in, namely  $6 \times 0$  through  $6 \times 5$ . Review how to find the products for these facts using skip counting ( $3 \times 6$ ,  $6 \times 5$ ), repeated addition ( $2 \times 6$ ), and groups ( $0 \times 6$ ,  $1 \times 6$ ,  $4 \times 6$ ).

$6 \times 3 = 3 \times 6 = 3 \text{ sixes} = 6, 12, 18$   
 $6 \times 4 = 4 \times 6 = 2 \text{ sixes} + 2 \text{ sixes} = 12 + 12 = 24$

Write the remaining 4 facts on the chalkboard.

$6 \times 6$      $6 \times 7$      $6 \times 8$      $6 \times 9$

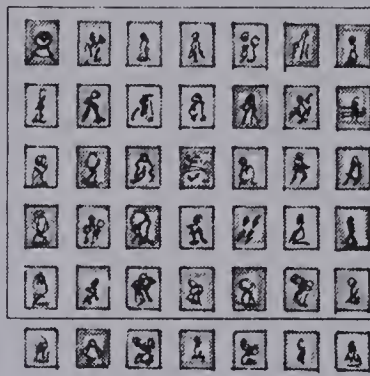
Explain that each one can be solved by breaking the 6 groups into smaller groups of 5 and 1, 3 and 3, or 2 and 4. For each fact demonstrate, by drawing arrays and circling the groups, and discuss the various ways to distribute or divide the 6 groups.

$6 \times 6 = 5 \text{ sixes} + 1 \text{ six} = 30 + 6 = 36$   
 $= 3 \text{ sixes} + 3 \text{ sixes} = 18 + 18 = 36$   
 $= 4 \text{ sixes} + 2 \text{ sixes} = 24 + 12 = 36$   
 $6 \times 7 = 5 \text{ sevens} + 1 \text{ seven} = 35 + 7 = 42$   
 $= 3 \text{ sevens} + 3 \text{ sevens} = 21 + 21 = 42$   
 $= 4 \text{ sevens} + 2 \text{ sevens} = 28 + 14 = 42$

Continue for  $6 \times 8$  and  $6 \times 9$ . Use the arrays pictured on page 224. Have various students fill in the chart for the remaining 6 times table, using both horizontal and vertical rows.

Six

How many hockey cards has Bill collected?



$\rightarrow 5 \text{ sevens} = 35$

and +

$\rightarrow 1 \text{ seven} = 7$

$6 \text{ sevens} = 42$

$6 \times 7 = 42$

$$\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$$

Bill has collected 42 cards in all.

EXERCISES

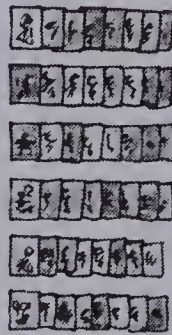
Multiply.

1.  $6 \times 8$

$\rightarrow 48$

2.  $8 \times 6$

$\times 6$   
 $\hline 48$



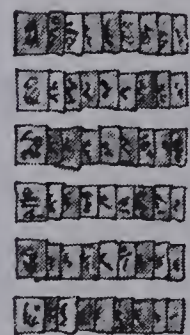
6 eights

3.  $6 \times 9$

$\rightarrow 54$

4.  $9 \times 6$

$\times 6$   
 $\hline 54$



6 nines

5. Draw 6 groups of 6 cards.  
How many cards in all? **36**

6. Draw 6 groups of 5 cards.  
How many cards in all? **30**

Using the Exercises

- For questions 1 and 3, encourage the students to use the arrays shown to distribute 6 groups in the easiest way possible to find the products.
- Questions 2 and 4 apply the order property. Read them aloud to review reading facts vertically.
- For questions 5 and 6, have the students draw groups of cards to help them find the products.



## PRACTICE

Copy and complete the equations.

1.  $0 \times 6 = 0$       2.  $1 \times 6 = 6$       3.  $2 \times 6 = 12$   
 $6 \times 0 = 0$        $6 \times 1 = 6$        $6 \times 2 = 12$

Multiply.

4.  $\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$       5.  $\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$       6.  $\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$       7.  $\begin{array}{r} 4 \\ \times 6 \\ \hline 24 \end{array}$       8.  $\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$       9.  $\begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array}$

Copy and complete the equations.

10. 5 sixes = 30  
 1 six = 6  
 6 sixes = 36  
 $6 \times 6 = 36$

11. 5 sevens = 35  
 1 seven = 7  
 6 sevens = 42  
 $6 \times 7 = 42$   
 $7 \times 6 = 42$

12. 5 eights = 40  
 1 eight = 8  
 $6 \times 8 = 48$   
 $8 \times 6 = 48$

13. 5 nines = 45  
 1 nine = 9  
 $6 \times 9 = 54$   
 $9 \times 6 = 54$

Multiply.

14.  $\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$       15.  $\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \end{array}$       16.  $\begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array}$       17.  $\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$       18.  $\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$       19.  $\begin{array}{r} 6 \\ \times 8 \\ \hline 48 \end{array}$

### What Can She Wear?

Pat has 6 different-coloured pairs of pants  
 and 5 different-coloured tops.

How many different outfits can Pat choose? 30

Hint! Make a chart.



225

### Extra Practice

Multiply.

1.  $\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$       2.  $\begin{array}{r} 3 \\ \times 6 \\ \hline 18 \end{array}$       3.  $\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$       4.  $\begin{array}{r} 1 \\ \times 6 \\ \hline 6 \end{array}$       5.  $\begin{array}{r} 6 \\ \times 4 \\ \hline 24 \end{array}$

6.  $\begin{array}{r} 6 \\ \times 7 \\ \hline 42 \end{array}$       7.  $\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \end{array}$       8.  $\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$       9.  $\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$       10.  $\begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array}$

11.  $\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$       12.  $\begin{array}{r} 2 \\ \times 6 \\ \hline 12 \end{array}$       13.  $\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$       14.  $\begin{array}{r} 6 \\ \times 9 \\ \hline 54 \end{array}$       15.  $\begin{array}{r} 6 \\ \times 8 \\ \hline 48 \end{array}$

### Worksheet A46

Pages 224-225

## Assigning the Practice

Minimum: 1-13

Average: 1-19

Enriched: 1-19

## Reinforcement

1. Using egg cartons and beans, have the students demonstrate the distribution of 6 groups of 6, 7, 8, and 9.

$6 \times 7$



3 sevens + 3 sevens



5 sevens + 1 seven

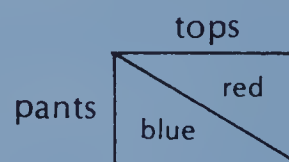


2 sevens + 4 sevens

2. Have students work in pairs with the 6 times table flash cards. Include  $6 \times 3$  and  $3 \times 6$  cards.

## Enrichment

1. Assign *What Can She Wear?* on page 225. Suggest drawing a chart with different-coloured felt pens as the hint says. Colour each "outfit" with the 2 colours.



2. Use 24 toothpicks.

How many  $\triangle$  can you make? (8)

How many  $\square$  can you make? (6)

How many  $\hexagon$  can you make? (4)

How many  $\bigcirc$  can you make? (3)

## Problem Solving Activities

Assign Level 3, Unit 12.

## Objective A47

Multiply with 7 as one of the factors.

## Introducing the Lesson

Write the following on the chalkboard.  
Ask the students to add in their heads.  
Write the sums as they are given.

$$\begin{array}{r} 42 \\ + 7 \\ \hline \end{array} \quad \begin{array}{r} 35 \\ + 14 \\ \hline \end{array} \quad \begin{array}{r} 28 \\ + 21 \\ \hline \end{array} \quad \begin{array}{r} 40 \\ + 16 \\ \hline \end{array} \quad \begin{array}{r} 32 \\ + 24 \\ \hline \end{array}$$

The above require no regrouping.  
These require regrouping. Ask the students to add in their heads. Explain that knowing these sums will help with the 7 times table.

$$\begin{array}{r} 48 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 55 \\ + 8 \\ \hline \end{array} \quad \begin{array}{r} 45 \\ + 18 \\ \hline \end{array} \quad \begin{array}{r} 36 \\ + 27 \\ \hline \end{array}$$

## Teaching the Lesson

Referring to the multiplication wall chart, have the students read aloud the part of the 7 times tables already filled in; namely  $7 \times 0$  to  $7 \times 6$ . Review how to find the products for these facts using appropriate strategies from Unit 7.

$$7 \times 2 = 2 \times 7 = 7 + 7 = 14$$

$$7 \times 5 = 7 \text{ fives} = 5, 10, 15, 20, 25, 30, 35$$

Write the remaining 3 facts on the chalkboard.

$$7 \times 7 \quad 7 \times 8 \quad 7 \times 9$$

Explain that each of these can be solved by breaking the 7 groups into smaller groups of 6 and 1, 5 and 2, or 4 and 3.

Refer to the hats on page 226 to demonstrate and discuss the various ways to distribute or divide 7 groups of 7.

$$7 \times 7 = 6 \text{ sevens} + 1 \text{ seven} = 42 + 7 = 49$$

$$= 5 \text{ sevens} + 2 \text{ sevens} = 35 + 14 = 49$$

$$= 4 \text{ sevens} + 3 \text{ sevens} = 28 + 21 = 49$$

Use the arrays on page 226 to show  $7 \times 8$  and  $7 \times 9$ .

Encourage the students to choose the distribution they find easiest, even though the text shows only one way.

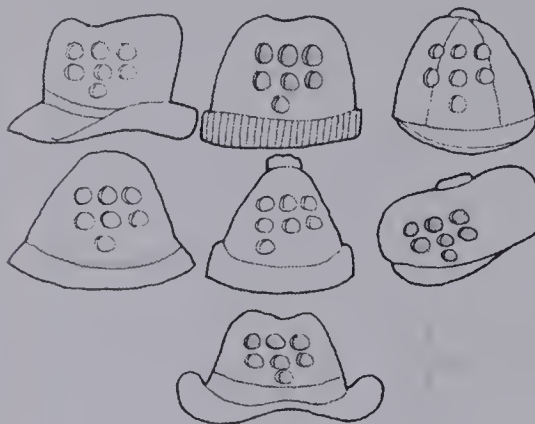
Fill in the chart for the remaining 7 times tables, both horizontally and vertically.

## Seven

Jackie has 6 hats with 7 pins on each.

Robbie has 1 hat with 7 pins on it.

How many pins do they have altogether?



They have 49 pins altogether.



$$6 \text{ sevens} = 42$$

$$\text{and } +$$

$$1 \text{ seven} = 7$$

$$7 \text{ sevens} = 49$$

$$7 \times 7 = 49$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

## EXERCISES

Multiply.

$$\begin{array}{r} 1. \quad 7 \times 6 \\ \quad \quad 42 \end{array}$$

$$\begin{array}{r} 2. \quad 6 \\ \times 7 \\ \hline 42 \end{array}$$

$$\begin{array}{r} 5. \quad 7 \times 8 \\ \quad \quad 56 \end{array}$$

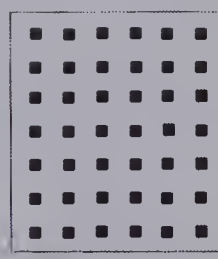
$$\begin{array}{r} 6. \quad 8 \\ \times 7 \\ \hline 56 \end{array}$$

$$\begin{array}{r} 3. \quad 7 \times 4 \\ \quad \quad 28 \end{array}$$

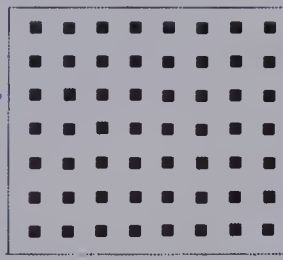
$$\begin{array}{r} 4. \quad 4 \\ \times 7 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 7. \quad 7 \times 9 \\ \quad \quad 63 \end{array}$$

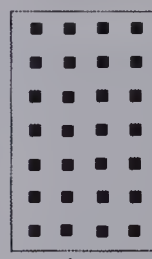
$$\begin{array}{r} 8. \quad 9 \\ \times 7 \\ \hline 63 \end{array}$$



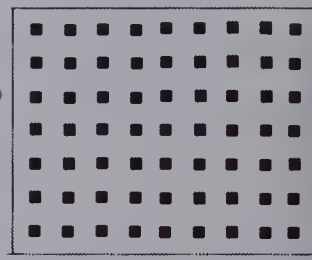
7 sixes



7 eights



7 fours



7 nines

## Using the Exercises

- Read questions 2, 4, 6, and 8 aloud to review reading facts written vertically. These employ the order property.
- Encourage the students to distribute 7 groups in the way that is easiest for them for questions 1, 3, 5, and 7.



## PRACTICE

Copy and complete the equations.

1.  $0 \times 7 = 0$       2.  $1 \times 7 = \blacksquare 7$       3.  $2 \times 7 = \blacksquare 14$   
 $7 \times 0 = \blacksquare 0$        $7 \times 1 = \blacksquare 7$        $7 \times 2 = \blacksquare 14$

Multiply.

4.  $\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$       5.  $\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$       6.  $\begin{array}{r} 7 \\ \times 4 \\ \hline 28 \end{array}$       7.  $\begin{array}{r} 4 \\ \times 7 \\ \hline 28 \end{array}$       8.  $\begin{array}{r} 7 \\ \times 5 \\ \hline 35 \end{array}$       9.  $\begin{array}{r} 5 \\ \times 7 \\ \hline 35 \end{array}$

Copy and complete the equations.

10. 6 sixes =  $\blacksquare 36$       11. 6 eights =  $\blacksquare 48$   
 1 six =  $\blacksquare 6$       1 eight =  $\blacksquare 8$   
 7 sixes =  $\blacksquare 42$       7 eights =  $\blacksquare 56$   
 $7 \times 6 = \blacksquare 42$        $7 \times 8 = \blacksquare 56$   
 $6 \times 7 = \blacksquare 42$        $8 \times 7 = \blacksquare 56$   
 12. 6 sevens =  $\blacksquare 42$       13. 6 nines =  $\blacksquare 54$   
 1 seven =  $\blacksquare 7$       1 nine =  $\blacksquare 9$   
 $7 \times 7 = \blacksquare 49$        $7 \times 9 = \blacksquare 63$   
 $9 \times 7 = \blacksquare 63$

Copy and complete each table.

14. 

$\times$	8	6	9	7	4
6	48	36	54	42	24

      15. 

$\times$	5	2	9	6	3	8	4
7	35	14	63	42	21	56	28

16. How can ...5678 help you remember  $7 \times 8$ ?  $7 \times 8 = 56$

## Button Button

How many buttons in all?

- $\odot$  7 buttons on a card      8 cards      56  
 $\odot$  8 buttons on a card      7 cards       $\begin{array}{r} + 56 \\ \hline 112 \end{array}$

227

## Assigning the Practice

Minimum: 1-16

Average: 1-16

Enriched: 1-16

## Reinforcement

1. Assign *Button Button* on page 227.

Encourage drawing a picture.

2. Combine the 6 and 7 times tables flash cards for the students to practise with. Have them work in pairs or small groups.

## Enrichment

1. Have the students fill in the following chart for "Calendar Count".

Weeks	3	1	8	5	2	7	4	9	6	0
Days in All										

2. Play "What's My Number?" (2-4 players) Prepare 4 cards for each number 0 to 7 and put them in a box. (Include 8 and 9 after Lessons 5 and 6 have been done.) A player chooses 2 cards, then holds up one card only and gives the product for the 2 cards. The other player is to tell what the other number card is. If correct, that player is given the 2 cards. When the box has been emptied, the player with the most cards wins.

## Extra Practice

## Worksheet A47

Pages 226-227

Multiply.

1.  $\begin{array}{r} 7 \\ \times 2 \\ \hline 14 \end{array}$       2.  $\begin{array}{r} 4 \\ \times 7 \\ \hline 28 \end{array}$       3.  $\begin{array}{r} 7 \\ \times 5 \\ \hline 35 \end{array}$       4.  $\begin{array}{r} 1 \\ \times 7 \\ \hline 7 \end{array}$       5.  $\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$   
 6.  $\begin{array}{r} 7 \\ \times 9 \\ \hline 63 \end{array}$       7.  $\begin{array}{r} 6 \\ \times 7 \\ \hline 42 \end{array}$       8.  $\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$       9.  $\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$       10.  $\begin{array}{r} 7 \\ \times 4 \\ \hline 28 \end{array}$   
 11.  $\begin{array}{r} 2 \\ \times 7 \\ \hline 14 \end{array}$       12.  $\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$       13.  $\begin{array}{r} 9 \\ \times 7 \\ \hline 63 \end{array}$       14.  $\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$       15.  $\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$

## Objective GR3

Interpret and construct pictographs.

### Introducing the Lesson

Construct a pictograph from hockey cards.

■ stands for 10 hockey cards.

Mary	■ ■ ■
Mike	■ ■ ■ ■ ■

Determine how many cards Mary and Mike each have if ■ stands for 10 cards. Then repeat the process, but assume ■ represents 1 card, 5 cards, and finally 2 cards.

### Teaching the Lesson

With the students interpret the model car pictograph on page 228. Use both multiplication and skip-counting to find the number of cars Ellen and Bob each have.

Discuss the following questions:

Who has fewer model cars? *Bob*

How many more cars does Ellen have?

$3 \times 5 = 15$  cars

How many cars do Ellen and Bob have together?  $9 \times 5 = 45$  or  $30 + 15 = 45$

Why are the cars all the same size and spaced the same? *So that comparisons can be made at a glance.*

## Pictographs

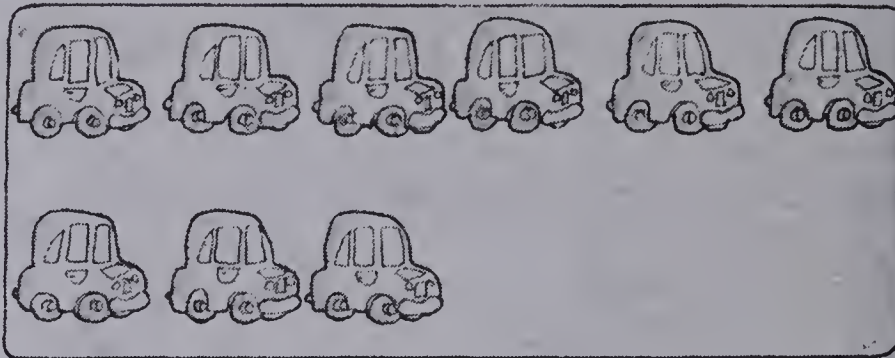
How many cars do Ellen and Bob really have?



stands for 5 model cars.



Ellen



Bob

Ellen has  $6 \times 5$  or 30 model cars.

Bob has  $3 \times 5$  or 15 model cars.

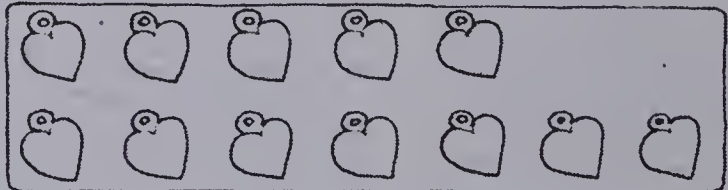
### EXERCISES

Answer each question below in a sentence.



stands for 2 gold charms.

Lisa



Chris

- How many charms does Chris have? *14*
- How many charms does Lisa have? *10*
- Who has more charms? *Chris*

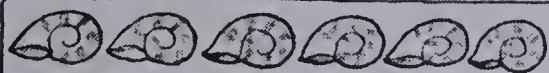
### Using the Exercises

- Some students will need to be reminded that each picture stands for not 1 but 2 gold charms.
- The directions request answers in sentence form.

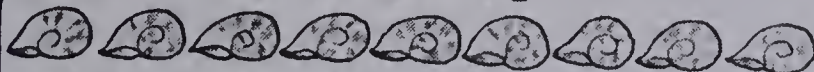


## PRACTICE

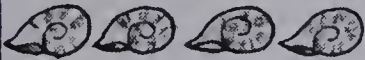
Margo



Judy



Corry



Suppose stands for 2 shells. How many does each have?

1. Corry 8      2. Margo 12      3. Judy 18

If stands for 5 shells, how many does each have?

4. Judy 45      5. Corry 20      6. Margo 30

Suppose stands for 10 shells. How many does each have?

7. Margo 60      8. Judy 90      9. Corry 40  
10. Who has the most shells? Judy  
11. Who has the fewest shells? Corry

## REVIEW

Multiply.

1.  $3 \times 6 = 18$       2.  $6 \times 3 = 18$       3.  $6 \times 1 = 6$       4.  $1 \times 6 = 6$       5.  $4 \times 9 = 36$       6.  $9 \times 4 = 36$   
7.  $9 \times 6 = 54$       8.  $8 \times 6 = 48$       9.  $7 \times 6 = 42$       10.  $6 \times 6 = 36$       11.  $5 \times 6 = 30$       12.  $4 \times 6 = 24$   
13.  $4 \times 7 = 28$       14.  $5 \times 7 = 35$       15.  $6 \times 7 = 42$       16.  $7 \times 7 = 49$       17.  $8 \times 7 = 56$       18.  $9 \times 7 = 63$

229

## Assigning the Practice

Minimum: 1-9  
Average: 1-11  
Enriched: 1-11

## Review Exercises

Questions	Objective	Pages
1-6	A45	222-223
7-12	A46	224-225
13-18	A47	226-227

## Reinforcement

1. Using hockey cards or baseball cards, show the close relationship between pictographs and block bar graphs. For pictographs, the individual cards stand for an amount. For bar graphs, the cards (as units of length) are accompanied by a cumulative scale that shows amounts.

Bill   
  
Bill 5 10 15 20

In general, pictographs and block bar graphs can be constructed from each other. For instance, grids or blocks can easily be placed around pictures in pictographs.

5 10 15

Prepare work cards that ask students to change block bar graphs into pictographs and vice versa.

## Enrichment

1. Have the students investigate how many different pictographs can be made using the following information.

30¢ in nickels is to be shared by Fran, Frank, and Freddie.  
Here is one example from the 28 possibilities.

stands for a nickel

Fran   
Frank   
Freddie

2. Have students propose questions that could be answered from pictographs constructed in class.

## Extra Practice

## Worksheet GR3

Pages 228-229

stands for 5 hockey cards.

Phil

Tina

Who has the fewer hockey cards? Tina

How many hockey cards does Phil have? 35

How many more does Phil have than Tina? 15

Draw more cards on the pictograph to show Phil has 40 cards and Tina has 30 cards.

## Objective A48

Multiply with 8 as one of the factors.

### Introducing the Lesson

Use the 8 times table flash cards to have an oral drill with the entire class of the  $8 \times 0$  to  $8 \times 7$  facts. Hold each card up for only 3 seconds.

### Teaching the Lesson

Ask the students for the remaining facts for the 8 times table, according to the multiplication wall chart. Write them on the board.

$$8 \times 8 \quad 8 \times 9$$

Demonstrate and discuss the various ways to distribute or divide groups of 8 and 9. Draw arrays to illustrate.

$$\begin{aligned} 8 \times 8 &= 4 \text{ eights} + 4 \text{ eights} = 32 + 32 = 64 \\ &= 5 \text{ eights} + 3 \text{ eights} = 40 + 24 = 64 \\ &= 7 \text{ eights} + 1 \text{ eight} = 56 + 8 = 64 \\ &= 6 \text{ eights} + 2 \text{ eights} = 48 + 16 = 64 \end{aligned}$$

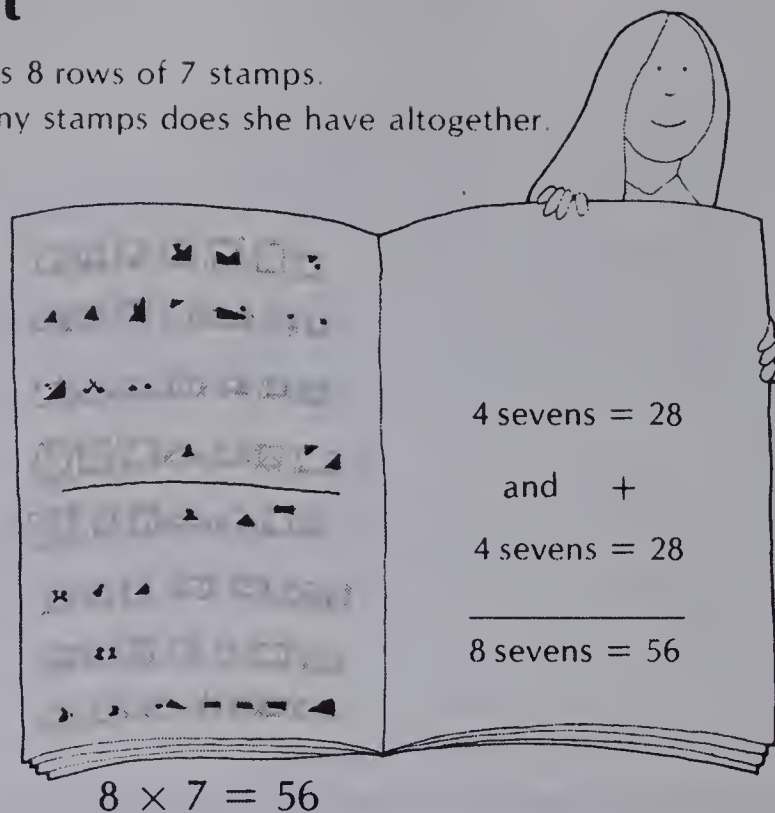
Explain that pages 230 and 231 of the text show 8 groups being distributed only into 4 groups and 4 groups. Encourage the students to use the distribution they find the easiest.

Fill in the chart for the remaining 8 times tables, both horizontally and vertically.

## Eight

Jenny has 8 rows of 7 stamps.

How many stamps does she have altogether.



$$8 \times 7 = 56$$

Jenny has 56 stamps in all.

$$\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$$

### EXERCISES

Multiply.

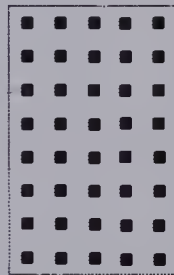
1.  $8 \times 5$

$$40$$

2.  $5$

$$\times 8$$

$$40$$



8 fives

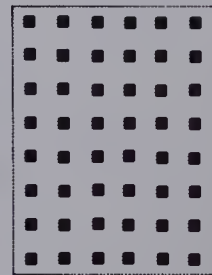
3.  $8 \times 6$

$$48$$

4.  $6$

$$\times 8$$

$$48$$



8 sixes

5. Draw 8 rows of 8 stamps.  
How many stamps in all? **64**

6. Draw 8 rows of 9 stamps.  
How many stamps in all? **72**

### Using the Exercises

- Questions 1 and 3 may be solved by using the arrays shown.
- Questions 2 and 4 employ the order property. Remind the students to read upward.
- Questions 5 and 6 require the students to draw their own array distribute the 8 groups, and to add in their heads to find how many stamps in all.



## PRACTICE

Copy and complete the equations.

1.  $0 \times 8 = 0$       2.  $1 \times 8 = \blacksquare 8$       3.  $2 \times 8 = \blacksquare 16$   
 $8 \times 0 = \blacksquare 0$        $8 \times 1 = \blacksquare 8$        $8 \times 2 = \blacksquare 16$

Multiply.

4.  $\begin{array}{r} 8 \\ \times 3 \\ \hline 24 \end{array}$       5.  $\begin{array}{r} 3 \\ \times 8 \\ \hline 24 \end{array}$       6.  $\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$       7.  $\begin{array}{r} 4 \\ \times 8 \\ \hline 32 \end{array}$       8.  $\begin{array}{r} 8 \\ \times 5 \\ \hline 40 \end{array}$       9.  $\begin{array}{r} 5 \\ \times 8 \\ \hline 40 \end{array}$

Copy and complete the equations.

10. 4 sixes =  $\blacksquare 24$       11. 4 sevens =  $\blacksquare 28$   
 4 sixes =  $\blacksquare 24$       4 sevens =  $\blacksquare 28$   
 8 sixes =  $\blacksquare 48$       8 sevens =  $\blacksquare 56$   
 $8 \times 6 = \blacksquare 48$        $8 \times 7 = \blacksquare 56$   
 $6 \times 8 = \blacksquare 48$        $7 \times 8 = \blacksquare 56$   
 12. 4 eights =  $\blacksquare 32$       13. 4 nines =  $\blacksquare 36$   
 4 eights =  $\blacksquare 32$       4 nines =  $\blacksquare 36$   
 $8 \times 8 = \blacksquare 64$        $8 \times 9 = \blacksquare 72$   
 $9 \times 8 = \blacksquare 72$

Multiply.

14.  $\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$       15.  $\begin{array}{r} 5 \\ \times 8 \\ \hline 40 \end{array}$       16.  $\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$       17.  $\begin{array}{r} 6 \\ \times 8 \\ \hline 48 \end{array}$       18.  $\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \end{array}$       19.  $\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$

## Worth 1000 Words

Five grownups shake hands with each other. How many handshakes are needed in all? *10*

Draw a picture to help you.



231

## Assigning the Practice

Minimum: 1-19

Average: 1-19

Enriched: 1-19

## Reinforcement

1. Take time to have the entire class try *Worth 1000 Words* on page 231. This is a short way of saying "A picture is worth 1000 words". Start them with a drawing and table for handshakes between 2 and 3 people.

Drawing	Number of People	Number of Handshakes
	2	1
	3	3
	4	6
	5	10

2. Continue the basic facts drill program by providing short, written quizzes which include the 6 and 7 times tables. Remember that three-second recall per fact is the goal. Students can record their results on a Multiplication Fact Master Card described in the Ideas section at the beginning of this unit.

## Enrichment

1. Fill in the  $\bigcirc$  with  $>$ ,  $<$ , or  $=$ .

$3 \times 8 \bigcirc 1 \times 8$        $5 \times 6 \bigcirc 4 \times 8$

$6 \times 7 \bigcirc 7 \times 6$        $4 \times 3 \bigcirc 2 \times 6$

$8 \times 8 \bigcirc 7 \times 7$        $7 \times 5 \bigcirc 6 \times 6$

$7 \times 6 \bigcirc 7 \times 8$        $6 \times 3 \bigcirc 9 \times 2$

2. Prepare cards like the following to play "Uncover".

$7 \times \text{[hand drawing]} = 56$

$8 \times \text{[hand drawing]} = 48$

$\text{[hand drawing]} \times 5 = 40$

Note: This game is good preparation for division.

## Extra Practice

Multiply

1.  $\begin{array}{r} 8 \\ \times 2 \\ \hline 16 \end{array}$       2.  $\begin{array}{r} 5 \\ \times 8 \\ \hline 40 \end{array}$       3.  $\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$       4.  $\begin{array}{r} 3 \\ \times 8 \\ \hline 24 \end{array}$       5.  $\begin{array}{r} 1 \\ \times 8 \\ \hline 8 \end{array}$   
 6.  $\begin{array}{r} 6 \\ \times 8 \\ \hline 48 \end{array}$       7.  $\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$       8.  $\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \end{array}$       9.  $\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$       10.  $\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$   
 11.  $\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$       12.  $\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$       13.  $\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$       14.  $\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$       15.  $\begin{array}{r} 4 \\ \times 8 \\ \hline 32 \end{array}$

## Worksheet A48

Pages 230-231

# UNIT 12 LESSON 6

## Objective A49

Multiply with 9 as one of the factors.

## Introducing the Lesson

Have an oral drill with the whole class of the  $9 \times 0$  to  $9 \times 8$  times tables. Hold each card up for only 3 seconds.

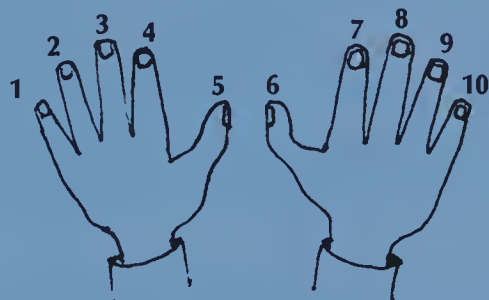
## Teaching the Lesson

Refer to the multiplication wall chart. Only one fact remains,  $9 \times 9$ . Demonstrate and discuss how to distribute 9 groups of nine. Use the rock collection pictured on page 232.

$$\begin{aligned} 9 \times 9 &= 8 \text{ nines} + 1 \text{ nine} = 72 + 9 = 81 \\ &= 7 \text{ nines} + 2 \text{ nines} = 63 + 18 = 81 \\ &= 6 \text{ nines} + 3 \text{ nines} = 54 + 27 = 81 \\ &= 5 \text{ nines} + 4 \text{ nines} = 45 + 36 = 81 \end{aligned}$$

Encourage the students to decide which distribution they find easiest and use it to solve the exercises on page 232.

Explain the "finger" way to multiply by 9. Number fingers (palms down) from 1 to 10 as shown.



For  $4 \times 9$ , bend the 4 finger and count all fingers to the left of 4 by tens and all the fingers to the right of 4 by ones.

10, 20, 30, plus 6 equals 36

So  $4 \times 9 = 36$

For  $6 \times 9$ , bend the 6 finger, so  $50 + 4 = 54$ . Refer to the bottom of page 233 for more practice.

# Nine

How many rocks does Susan have in her collection?



$$9 \times 9 = 81$$

Susan has 81 rocks in her collection.

$$8 \text{ nines} = 72$$

and +

$$1 \text{ nine} = 9$$

$$9 \text{ nines} = 81$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

## EXERCISES

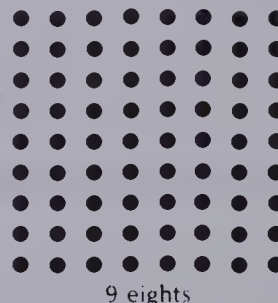
Multiply.

$$\begin{array}{r} 1. \quad 9 \times 8 \\ \hline 72 \end{array}$$

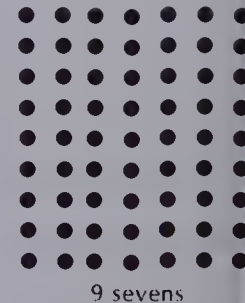
$$\begin{array}{r} 2. \quad 8 \\ \times 9 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 3. \quad 9 \times 7 \\ \hline 63 \end{array}$$

$$\begin{array}{r} 4. \quad 7 \\ \times 9 \\ \hline 63 \end{array}$$



9 eights



9 sevens

5. Draw 9 rows of 6 ●'s.  
How many ●'s in all? 54

6. Draw 9 rows of 5 ●'s.  
How many ●'s in all? 45

## Using the Exercises

- Encourage the students to use the arrays pictured to find the products for questions 1 to 4.
- Questions 5 and 6 require the students to draw their own array to find the products.



## PRACTICE

Copy and complete the equations.

1.  $0 \times 9 = 0$       2.  $1 \times 9 = \blacksquare 9$       3.  $2 \times 9 = \blacksquare 18$   
 $9 \times 0 = \blacksquare 0$        $9 \times 1 = \blacksquare 9$        $9 \times 2 = \blacksquare 18$

Multiply.

4.  $\begin{array}{r} 9 \\ \times 3 \\ \hline 27 \end{array}$       5.  $\begin{array}{r} 3 \\ \times 9 \\ \hline 27 \end{array}$       6.  $\begin{array}{r} 9 \\ \times 4 \\ \hline 36 \end{array}$       7.  $\begin{array}{r} 4 \\ \times 9 \\ \hline 36 \end{array}$       8.  $\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$       9.  $\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array}$

Copy and complete the equations.

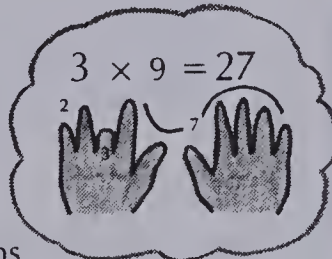
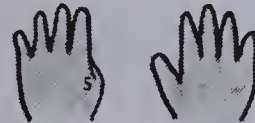
10.  $\begin{array}{l} 8 \text{ sixes} = \blacksquare 48 \\ 1 \text{ six} = \blacksquare 6 \end{array}$       11.  $\begin{array}{l} 8 \text{ sevens} = \blacksquare 56 \\ 1 \text{ seven} = \blacksquare 7 \end{array}$   
 $9 \text{ sixes} = \blacksquare 54$        $9 \text{ sevens} = \blacksquare 63$   
 $9 \times 6 = \blacksquare 54$        $9 \times 7 = \blacksquare 63$   
 $6 \times 9 = \blacksquare 54$        $7 \times 9 = \blacksquare 63$
12.  $\begin{array}{l} 8 \text{ eights} = \blacksquare 64 \\ 1 \text{ eight} = \blacksquare 8 \end{array}$       13.  $\begin{array}{l} 8 \text{ nines} = \blacksquare 72 \\ 1 \text{ nine} = \blacksquare 9 \end{array}$   
 $9 \times 8 = \blacksquare 72$        $9 \times 9 = \blacksquare 81$   
 $8 \times 9 = \blacksquare 72$

Multiply.

14.  $\begin{array}{r} 7 \\ \times 9 \\ \hline 63 \end{array}$       15.  $\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$       16.  $\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array}$       17.  $\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$       18.  $\begin{array}{r} 4 \\ \times 9 \\ \hline 36 \end{array}$       19.  $\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$

## Collecting Finger Patterns

1.  $\begin{array}{l} 8 \\ \times 9 \\ \hline 72 \end{array}$       2.  $\begin{array}{l} 5 \\ \times 9 \\ \hline 45 \end{array}$



3. Do Questions 14-18 above using finger patterns.

233

## Assigning the Practice

Minimum: 1-19

Average: 1-19

Enriched: 1-19

## Reinforcement

1. Assign *Collecting Finger Patterns* on page 233.

2. Continue with the drill program using the Fact Master Card.

3. Combine the 8 and 9 times tables flash cards. Have students practise in pairs or in small groups.

## Enrichment

1. Fill in the blanks. Can you see a pattern?

$9 \times 2 = \boxed{1} 8$	$9 \times 2 = 1 \boxed{8}$	$1 + 8 = 9$
$9 \times 3 = \boxed{2} 7$	$9 \times 3 = 2 \boxed{7}$	$2 + 7 = 9$
$9 \times 4 = \boxed{3} 6$	$9 \times 4 = 3 \boxed{6}$	$3 + 6 = 9$
$9 \times 5 = \boxed{4} 5$	$9 \times 5 = 4 \boxed{5}$	$4 + 5 = 9$
$9 \times 6 = \boxed{5} 4$	$9 \times 6 = 5 \boxed{4}$	$5 + 4 = 9$
$9 \times 7 = \boxed{6} 3$	$9 \times 7 = 6 \boxed{3}$	$6 + 3 = 9$
$9 \times 8 = \boxed{7} 2$	$9 \times 8 = 7 \boxed{2}$	$7 + 2 = 9$
$9 \times 9 = \boxed{8} 1$	$9 \times 9 = 8 \boxed{1}$	$8 + 1 = 9$

How do you find the first digit of the product when multiplying by 9? *One less than the number that 9 is multiplied by.*

How do you find the second digit of the product when multiplying by 9? *First digit + second digit = 9.*

2. Find the products for the 11 times tables. What pattern do the products make? *The product is the number that 11 is multiplied by written twice.*

Find the product for the 12 times tables. What do you notice about the last digits of the products? *They form a sequence 0, 2, 4, 6, 8.*

## Extra Practice

## Worksheet A49

Pages 232-233

Multiply.

1.  $\begin{array}{r} 9 \\ \times 3 \\ \hline 27 \end{array}$       2.  $\begin{array}{r} 2 \\ \times 9 \\ \hline 18 \end{array}$       3.  $\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$       4.  $\begin{array}{r} 4 \\ \times 9 \\ \hline 36 \end{array}$       5.  $\begin{array}{r} 1 \\ \times 9 \\ \hline 9 \end{array}$
6.  $\begin{array}{r} 7 \\ \times 9 \\ \hline 63 \end{array}$       7.  $\begin{array}{r} 6 \\ \times 9 \\ \hline 54 \end{array}$       8.  $\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$       9.  $\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \end{array}$       10.  $\begin{array}{r} 7 \\ \times 6 \\ \hline 42 \end{array}$
11.  $\begin{array}{r} 6 \\ \times 9 \\ \hline 54 \end{array}$       12.  $\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$       13.  $\begin{array}{r} 9 \\ \times 7 \\ \hline 63 \end{array}$       14.  $\begin{array}{r} 5 \\ \times 8 \\ \hline 40 \end{array}$       15.  $\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$

## Objective M15

Measure area using non-standard units and square centimetres.

## Introducing the Lesson

Display the outline of a rectangle with an overhead projector. Identify the length and width of the rectangle. Get suggestions of different units to measure the width of the rectangle (paper clip unit, eraser unit, centimetre unit).

Ask, "How can we measure the space inside the rectangle?" Get suggestions of different units to cover the space (dominoes, checkers, erasers, playing cards, pencils). Measure the space using several of the units suggested by students.

## Teaching the Lesson

Read and discuss the presentation on page 234. Demonstrate the area of the rectangle on the overhead projector using 3 different units. Associate the terms "cover" and "covering" with the concept of area measurement. Explain the rules for an **area covering** (see page 211):

1. The area units do not overlap.
2. The figure is hidden by the area units, but no other space is.

Have several students describe a centimetre square in their own words. Challenge them to choose the centimetre squares from the construction paper squares and rectangles prepared for the exercises.

## Area

**Area** is the measure of the space inside a figure.

What is the area of this figure?  
It depends on the **unit** used!

It takes 10

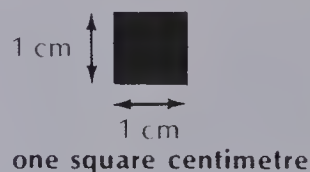


to cover the figure.

It takes 5



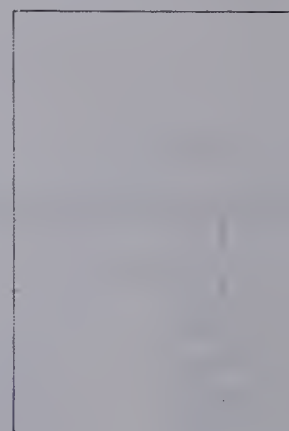
to cover the figure.



It takes 20 square centimetres.

## EXERCISES

1. How many bird stamps are needed to cover the figure? **12**
2. How many fish stamps are needed to cover the figure? **6**
3. What is the area of the figure in square centimetres? **24 cm<sup>2</sup>**



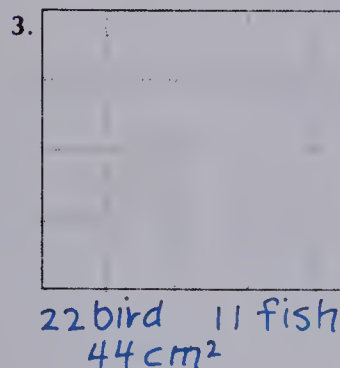
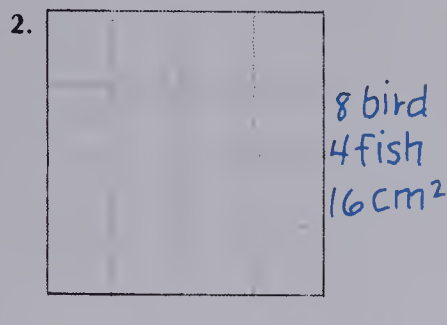
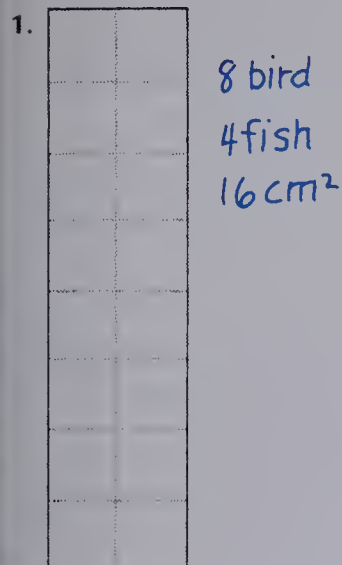
## Using the Exercises

- Cut out enough area units from construction paper to supply each pair of students with 50 centimetre squares, 25 bird stamp units (1 cm by 2 cm), and 13 fish stamp units (2 cm by 2 cm). Expect the students to use the area units to find or to justify their answers.



## PRACTICE

Find three areas for each shape using these units:  
bird stamps, fish stamps, square centimetres.



## Small Tables

Copy and complete each table.

1.

×	6	7
8	48	56
9	54	63

2.

×	3	7	8	5	4
9	27	63	72	45	36

3.

×	5	9
6	30	54
5	25	45

4.

×	8	7
6	48	42
9	72	63

235

## Assigning the Practice

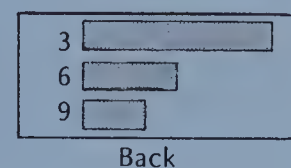
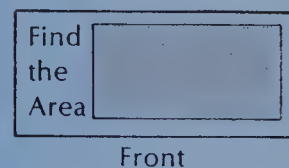
Minimum: 1-3

Average: 1-3

Enriched: 1-3

## Reinforcement

1. Prepare area work cards that let the students use 3 different units of area. Provide the answers on the back of each work card.



2. Let students investigate the areas of various regions using a variety of units. Provide a form as follows to encourage estimation.

Unit of Area	Object	Estimate	Measure
eraser	book	50	42
bird stamp	book	30	40

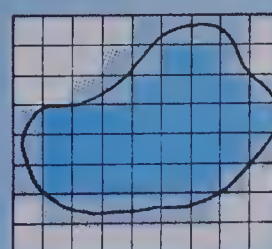
## Enrichment

1. Assign *Small Tables* on page 235. Have the students make their own small multiplication tables to challenge their friends.

2. Newspaper sheets can be used to measure the area of large regions, such as the cloak room floor or a large table. Expect students to make a reasonable estimate before they measure. Record the estimates and measurements on a bulletin board.

3. Show students how to estimate the area of a figure that is irregular by using a centimetre-square grid transparency. Students count the number of squares that lie completely inside the figure and the number of squares needed to completely cover the figure. The area of the region is between these two numbers.

Here is an example:



27 ■ are inside  
48 ■ will cover

The area is about 37 ■.

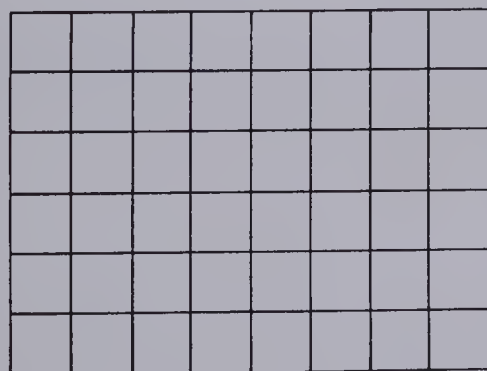
## Extra Practice

Find the area of the rectangle.

12 stamps

24 stamps

48 square centimetres



## Worksheet M15


Pages 234-235

## Objective M16

Use multiplication to find the area of a rectangle.

## Introducing the Lesson

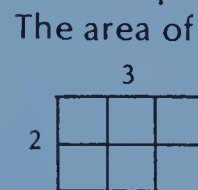
Using an overhead projector, present a series of gridded rectangles, (2 by 3, 2 by 5, 3 by 4, 3 by 5, 5 by 5, and so on). Challenge students to look for a pattern as a chart recording length, width, and area is filled out. Eventually most students will notice that  $\text{length} \times \text{width} = \text{area}$ .

	<b>Length</b>	<b>Width</b>	<b>Area</b>
	3	2	6 squares

## Teaching the Lesson

With materials such as Centicubes, demonstrate why:  
 $\text{length} \times \text{width} = \text{area}$ .

For example,



is  $3 \times 2 = 6$  square centimetres.

Three groups of two  equal 6.

Using centimetre-square chart paper (or a transparency on an overhead projector), challenge students to draw rectangles associated with the following products.

$4 \times 5 = 20 \quad 5 \times 3 = 15 \quad 7 \times 5 = 35$

$7 \times 7 = 49 \quad 8 \times 8 = 64 \quad 6 \times 6 = 36$

9 square centimetres

14 square centimetres

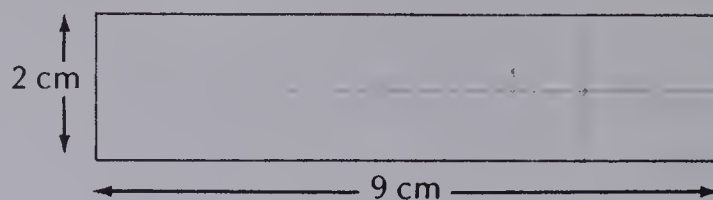
8 square centimetres

12 square centimetres

Read and discuss the presentation on page 236. Note that the area of the gridded figures which are not rectangles cannot be found by multiplication. For irregular figures, an area has meaning but it allows only an estimate.

## Finding Area

The area of a rectangle can be found by multiplying.



If you count, you get 18 square centimetres.

If you multiply, you get  $2 \times 9 = 18$ .

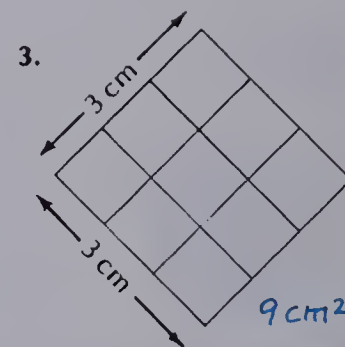
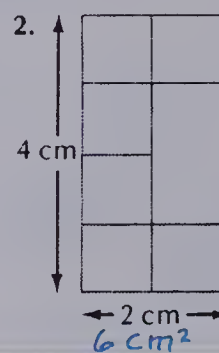
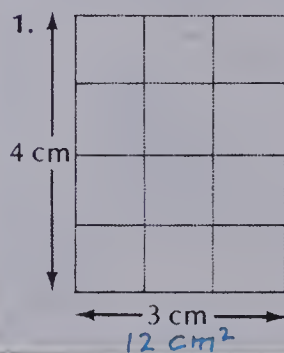
To find some areas, you cannot just multiply.

To find some areas, you cannot just count.

## EXERCISES

Find the area in square centimetres.

Multiply when you can. Otherwise count.



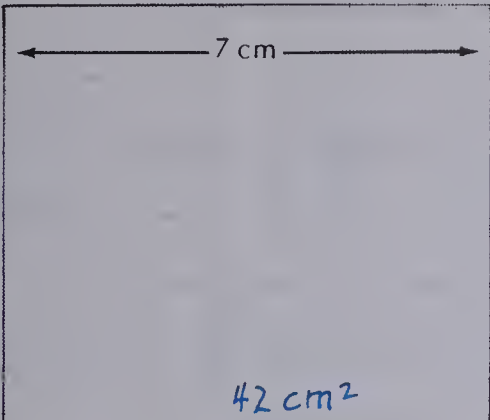
## Using the Exercises

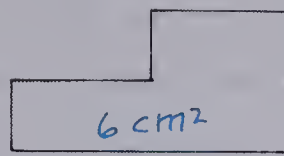
- It is recommended that students experience the activities described in the Reinforcement section before exercises are assigned.
- Make sure students recognize that question 2 cannot be done merely by multiplying 2 by 4 because the figure is not a rectangle.

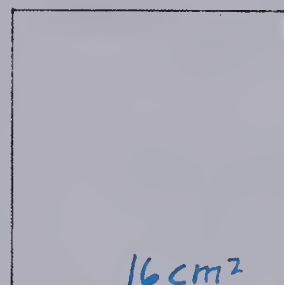


## PRACTICE

Find the area in square centimetres.  
Multiply if possible. Otherwise count.

1.  42 cm<sup>2</sup>

2.  6 cm<sup>2</sup>

3.  16 cm<sup>2</sup>

Trace the grid to draw figures with these areas.

4. 20 square centimetres  $4 \times 5$     5. 54 square centimetres  $(6 \times 9)$   
6. 21 square centimetres  $3 \times 7$     7. 56 square centimetres  $(7 \times 8)$

## REVIEW

Multiply.

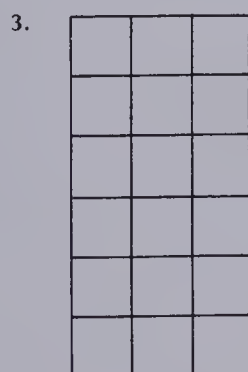
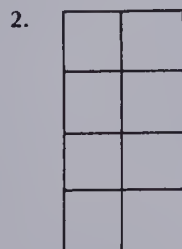
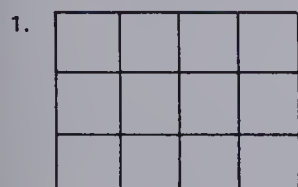
1.  $8 \times 4 = 32$     2.  $8 \times 7 = 56$     3.  $3 \times 8 = 24$     4.  $5 \times 8 = 40$   
A48 5.  $8 \times 9 = 72$     6.  $8 \times 8 = 64$     7.  $6 \times 8 = 48$     8.  $2 \times 8 = 16$   
A49 9.  $9 \times 4 = 36$     10.  $9 \times 7 = 63$     11.  $3 \times 9 = 27$     12.  $8 \times 9 = 72$   
13.  $9 \times 5 = 45$     14.  $9 \times 9 = 81$     15.  $6 \times 9 = 54$     16.  $2 \times 9 = 18$

237

## Extra Practice

Find the area in square centimetres.

1.  $4 \times 3 = 12$  square centimetres



2.  $2 \times 4 = 8$  square centimetres

3.  $3 \times 6 = 18$  square centimetres

## Worksheet M16

Pages 236-237

## Assigning the Practice

Minimum: none

Average: 1-7

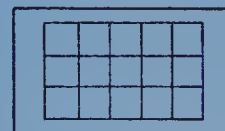
Enriched: 1-7

## Review Exercises

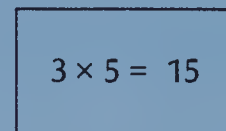
Questions	Objective	Pages
1-8	A48	230-231
9-16	A49	232-233

## Reinforcement

1. Prepare a set of 30 work cards to practise the area description of multiplication.



Front



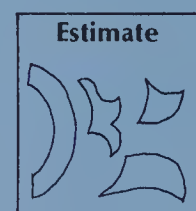
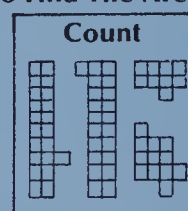
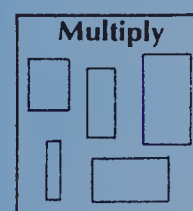
Back

2. Challenge students to draw 2 rectangles on graph paper for each of the following areas. Discuss the solutions.

	12	16
square centimetres	20	24
	18	30

3. The presentation on page 236 alludes to three ways of finding area: multiply for rectangles; count for gridded figures; and estimate for irregular figures. (See the Enrichment section on page 235.) Have students classify a set of figures on a classification poster.

### To Find The Area



## Enrichment

### Body Area Project

Each student traces around a partner's foot, fist, head, and finally whole body on centimetre square graph paper. Students use the inside-outside estimation method described on page 235 to find the area of each body part.

Unit 12 Objective	Test Questions	Pages
A45	1-8	222-223
A46	9-16	224-225
A47	17-24	226-227
A48	25-32	230-231
A49	33-40	232-233

# TEST

# UNIT 12

Copy and complete.

$$1. \quad 3 \times 5 = \boxed{15}$$

$$2. \quad \begin{array}{r} 5 \\ \times 3 \\ \hline \end{array} \boxed{15}$$

$$3. \quad 6 \times 2 = \boxed{12}$$

$$4. \quad \begin{array}{r} 2 \\ \times 6 \\ \hline \end{array} \boxed{12}$$

$$5. \quad 2 \times \boxed{7} = 14$$

$$6. \quad \begin{array}{r} \boxed{7} \\ \times 2 \\ \hline \end{array} 14$$

$$7. \quad \boxed{4} \times 9 = 36$$

$$8. \quad \begin{array}{r} 9 \\ \times \boxed{4} \\ \hline \end{array} 36$$

Multiply.

$$9. \quad 6 \times 6 = 36$$

$$10. \quad 3 \times 6 = 18$$

$$11. \quad 6 \times 7 = 42$$

$$12. \quad 5 \times 6 = 30$$

$$13. \quad \begin{array}{r} 7 \\ \times 6 \\ \hline \end{array} 42$$

$$14. \quad \begin{array}{r} 6 \\ \times 9 \\ \hline \end{array} 54$$

$$15. \quad \begin{array}{r} 6 \\ \times 8 \\ \hline \end{array} 48$$

$$16. \quad \begin{array}{r} 4 \\ \times 6 \\ \hline \end{array} 24$$

$$17. \quad 7 \times 7 = 49$$

$$18. \quad 7 \times 3 = 21$$

$$19. \quad 8 \times 7 = 56$$

$$20. \quad 0 \times 7 = 0$$

$$21. \quad \begin{array}{r} 9 \\ \times 7 \\ \hline \end{array} 63$$

$$22. \quad \begin{array}{r} 6 \\ \times 7 \\ \hline \end{array} 42$$

$$23. \quad \begin{array}{r} 7 \\ \times 5 \\ \hline \end{array} 35$$

$$24. \quad \begin{array}{r} 7 \\ \times 4 \\ \hline \end{array} 28$$

$$25. \quad 8 \times 8 = 64$$

$$26. \quad 5 \times 8 = 40$$

$$27. \quad 8 \times 6 = 48$$

$$28. \quad 8 \times 1 = 8$$

$$29. \quad \begin{array}{r} 8 \\ \times 7 \\ \hline \end{array} 56$$

$$30. \quad \begin{array}{r} 9 \\ \times 8 \\ \hline \end{array} 72$$

$$31. \quad \begin{array}{r} 8 \\ \times 3 \\ \hline \end{array} 24$$

$$32. \quad \begin{array}{r} 4 \\ \times 8 \\ \hline \end{array} 32$$

$$33. \quad 9 \times 9 = 81$$

$$34. \quad 3 \times 9 = 27$$

$$35. \quad 9 \times 8 = 72$$

$$36. \quad 9 \times 7 = 63$$

$$37. \quad \begin{array}{r} 9 \\ \times 6 \\ \hline \end{array} 54$$

$$38. \quad \begin{array}{r} 5 \\ \times 9 \\ \hline \end{array} 45$$

$$39. \quad \begin{array}{r} 0 \\ \times 9 \\ \hline \end{array} 0$$

$$40. \quad \begin{array}{r} 4 \\ \times 9 \\ \hline \end{array} 36$$

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## Unit 12

Post-test

Multiply.

$$1. \quad 2 \times 3 = 6$$

$$2. \quad \begin{array}{r} 3 \\ \times 2 \\ \hline \end{array} 6$$

$$3. \quad 8 \times 4 = 32$$

$$4. \quad \begin{array}{r} 4 \\ \times 8 \\ \hline \end{array} 32$$

$$5. \quad 5 \times 3 = 15$$

$$6. \quad \begin{array}{r} 3 \\ \times 5 \\ \hline \end{array} 15$$

$$7. \quad 4 \times 4 = 16$$

$$8. \quad \begin{array}{r} 4 \\ \times 4 \\ \hline \end{array} 16$$

$$9. \quad \begin{array}{r} 6 \\ \times 5 \\ \hline \end{array} 30$$

$$10. \quad \begin{array}{r} 7 \\ \times 6 \\ \hline \end{array} 42$$

$$11. \quad \begin{array}{r} 6 \\ \times 9 \\ \hline \end{array} 54$$

$$12. \quad \begin{array}{r} 6 \\ \times 8 \\ \hline \end{array} 48$$

$$13. \quad \begin{array}{r} 4 \\ \times 6 \\ \hline \end{array} 24$$

$$14. \quad \begin{array}{r} 6 \\ \times 6 \\ \hline \end{array} 36$$

$$15. \quad \begin{array}{r} 3 \\ \times 6 \\ \hline \end{array} 18$$

$$16. \quad \begin{array}{r} 6 \\ \times 7 \\ \hline \end{array} 42$$

$$17. \quad \begin{array}{r} 7 \\ \times 5 \\ \hline \end{array} 35$$

$$18. \quad \begin{array}{r} 7 \\ \times 4 \\ \hline \end{array} 28$$



## SUBTRACTION

Subtract.

- |  |  |  |   |
|--|--|--|---|
| 1. $\begin{array}{r} 356 \\ -128 \\ \hline 228 \end{array}$  | 2. $\begin{array}{r} 742 \\ -408 \\ \hline 334 \end{array}$  | 3. $\begin{array}{r} 680 \\ -606 \\ \hline 74 \end{array}$   | 4. $\begin{array}{r} 873 \\ -5 \\ \hline 868 \end{array}$   |
| 5. $\begin{array}{r} 354 \\ -193 \\ \hline 161 \end{array}$  | 6. $\begin{array}{r} 870 \\ -790 \\ \hline 80 \end{array}$   | 7. $\begin{array}{r} 329 \\ -64 \\ \hline 265 \end{array}$   | 8. $\begin{array}{r} 446 \\ -86 \\ \hline 360 \end{array}$  |
| 9. $\begin{array}{r} 632 \\ -254 \\ \hline 378 \end{array}$  | 10. $\begin{array}{r} 525 \\ -156 \\ \hline 369 \end{array}$ | 11. $\begin{array}{r} 350 \\ -173 \\ \hline 177 \end{array}$ | 12. $\begin{array}{r} 577 \\ -98 \\ \hline 479 \end{array}$ |
| 13. $\begin{array}{r} 406 \\ -137 \\ \hline 269 \end{array}$ | 14. $\begin{array}{r} 705 \\ -63 \\ \hline 642 \end{array}$  | 15. $\begin{array}{r} 400 \\ -237 \\ \hline 163 \end{array}$ | 16. $\begin{array}{r} 600 \\ -75 \\ \hline 525 \end{array}$ |

Find the difference.

17. \$7.26 and \$3.54  $\$3.72$
18. \$2.28 and \$6.47  $\$4.19$
19. \$1.35 and \$6.00  $\$4.65$
20. \$2.07 and \$0.75  $\$1.32$

Solve. Show both steps.

21. 625 coins in a collection  
175 are Canadian.  
235 are American.  
How many coins come from elsewhere?
- |  |  |
|--|--|
| $\begin{array}{r} 235 \\ +175 \\ \hline 410 \end{array}$ | $\begin{array}{r} 625 \\ -410 \\ \hline 215 \text{ coins} \end{array}$ |
|--|--|

- |  |   |   |   |   |
|--|---|---|---|---|
| 9. $\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$ | 20. $\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$ | 21. $\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$ | 22. $\begin{array}{r} 1 \\ \times 7 \\ \hline 7 \end{array}$  | 23. $\begin{array}{r} 9 \\ \times 7 \\ \hline 63 \end{array}$ |
| 4. $\begin{array}{r} 4 \\ \times 7 \\ \hline 28 \end{array}$ | 25. $\begin{array}{r} 3 \\ \times 8 \\ \hline 24 \end{array}$ | 26. $\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$ | 27. $\begin{array}{r} 8 \\ \times 7 \\ \hline 56 \end{array}$ | 28. $\begin{array}{r} 9 \\ \times 8 \\ \hline 72 \end{array}$ |
| 9. $\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$ | 30. $\begin{array}{r} 5 \\ \times 8 \\ \hline 40 \end{array}$ | 31. $\begin{array}{r} 8 \\ \times 6 \\ \hline 48 \end{array}$ | 32. $\begin{array}{r} 0 \\ \times 8 \\ \hline 0 \end{array}$  | 33. $\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$ |
| 4. $\begin{array}{r} 7 \\ \times 9 \\ \hline 63 \end{array}$ | 35. $\begin{array}{r} 4 \\ \times 9 \\ \hline 36 \end{array}$ | 36. $\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \end{array}$ | 37. $\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array}$ | 38. $\begin{array}{r} 2 \\ \times 9 \\ \hline 18 \end{array}$ |
9.  $6 \times 9 = 54$
40.  $9 \times 9 = 81$

# UNIT 13

## Division Facts II

Theme: Music and Dance

Lesson		Objective	Vocabulary	Materials
Preview		Divide by 2, 3, 4, and 5 in horizontal form.	quotient, division, divide	multiplication chart
1	A50	Divide in vertical form with dividends to 45.	vertical, horizontal, divided by, divided into	covered factor cards and division flash cards for dividends to 45, blank cards 3 cm × 5 cm
2	A51	Divide by sharing to find the number in each group, given the number of groups.	How many in each group?	playing cards, candies
3	A52	Introduce remainders with dividends to 49.	remainder	magnetic counters
4	A53	Divide by 6 and 7 with dividends to 63.		covered factor cards, division flash cards for divisors of 6 and 7
5	A54	Divide by 8 and 9 with dividends to 81.		covered factor cards, division flash cards for divisors of 8 and 9
6	N10	Write the fraction for the shaded part of a region.	fraction, whole, half, third, fourth, fifth, tenth	grid paper
7	N11	Compare two fractions with the same denominator.	less than, greater than	grid paper
8	N12	Write the fraction for part of a set.	set	grid paper, counters in various colours
Test		Division facts with dividends to 81		
Review		Multiplication facts with products to 81		



# About This Unit

Unit 13 continues the development of the measurement idea for division begun in Unit 8 and introduces the remaining division facts with divisors of 6, 7, 8, and 9. Students are not expected to have recall of the division facts with divisors of 2, 3, 4, and 5 before beginning Unit 13. In fact, a drill program for these facts can be an integral part of this unit, with the larger facts being added as students are ready. Teachers are advised to check their curriculum guidelines before starting this unit. Some guidelines do not call for mastery of division by 6, 7, 8, and 9 until the grade 4 level. In this case, teachers may want to spend little or no time on Lessons 4 and 5.

It is important to emphasize that students should be placed on a drill program only after they are able to find the quotients. This applies to both Unit 8 and Unit 13. Like subtraction, division is traditionally considered to be a difficult topic for it relies on the inverse relationship between multiplication and division. Students need to rely less on concrete manipulations and more on their ability to recall multiplication facts to find the missing factor.

$$24 \div 8$$



How many 8s in 24?  
 $\square \times 8 = 24$

Therefore, students will require both time and a variety of experiences to internalize the division concept. Only after they are able to use multiplication to solve division facts are they ready for a drill program as outlined in the Ideas sections for Units 8 and 13.

Unit 13 also introduces students to three new ideas related to division:

1. The vertical notation for writing division:

$$42 \div 6 \quad \text{or} \quad 6 \overline{)42}$$

2. The remainder concept using knowledge of basic facts:

$$6 \overline{)45}$$

3. The partitive (*How many in each group?*) notion of division.

The last three lessons in Unit 13 develop the fraction concepts of part of a region, part of a set, and the comparing of two fractions with the same denominator.

The 3 types of cards suggested for this unit are:

1. Covered (missing) factor cards (8 cm  $\times$  20 cm).


$$\times 3 = 27$$

Front

$$9 \times 3 = 27$$

Back

2. Division flash cards (8 cm  $\times$  20 cm).

$$27 \div 3 =$$


Front

$$27 \div 3 = 9$$

Back

3. Blank cards (3 cm  $\times$  5 cm). Students write the digits 0 to 9 on them and use them in Lessons 1, 4, and 5.

## Ideas

The theme for Unit 13 is *Music and Dance*. The title page illustrations and word problems reflect this theme. The following are some ideas for incorporating this theme into other subject areas, as well as outlining a drill program.

1. Use the pictures on page 240 to name and discuss the musical instruments. This can lead to a variety of activities.
  - a. Display and demonstrate some instruments from the local high school band.
  - b. Listen to records to identify the sounds of some of the instruments.
  - c. Stage a talent show by members of the class.
  - d. Discuss and classify instruments according to family (brass, string, woodwind, and percussion).
  - e. Research famous composers by reading their biographies.
2. Physical Education is another area that can be expanded by using this theme.
  - a. Teach specific dances like square dancing and the Mexican Hat Dance.
  - b. Begin gym class with exercises to music.

3. A Drill Program using the Division Fact Master to record a student's progress with mastery of facts to 81 should be started. Use either flash cards or a sequence of quiz sheets to allow for individual progress. Allow only 3 seconds to answer each question. Record on the Division Fact Master in the following ways:  
 1st time correct — light shading  
 2nd time correct — dark shading  
 3rd time correct — sticker  
 The Division Fact Master is a modified multiplication chart, but is used differently.

÷	0	1	2	3	4	5	6	7	8	9
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

For  $36 \div 4$ , locate the divisor in the left hand column and follow the row to the dividend. The quotient is the number above the dividend in the top row. Shade in the 36 to show mastery.

Unit 13 Objective	Test Questions	Pages
A50	1-8	242-243
A51	9-10	244-245
A52	11-18	246-247
A53	19-22	248-249
A54	23-26	250-251
N10	27-30	252-253
N11	31	254-255
N12	32	256-257

# UNIT 13

## DIVISION FACTS I



### Pretest

Unit 13

Divide.

- 4

1.  $4 \overline{)16}$
- 8

2.  $5 \overline{)40}$
- 8

3.  $3 \overline{)24}$
- 9

4.  $2 \overline{)18}$
- 5

5.  $5 \overline{)25}$
- 6

6.  $3 \overline{)18}$
- 8

7.  $4 \overline{)32}$
- 6

8.  $2 \overline{)12}$

How many cards for each player?

9. 30 cards

5 players 6
10. 24 cards

4 players 6

Divide.

- 3 R1

11.  $3 \overline{)10}$
- 5 R2

12.  $5 \overline{)27}$
- 4 R2

13.  $4 \overline{)18}$
- 8 R1

14.  $2 \overline{)17}$
- 6 R3

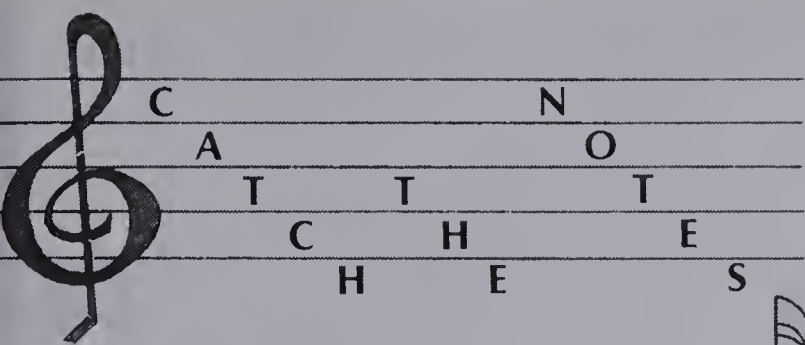
15.  $5 \overline{)33}$
- 6 R3

16.  $4 \overline{)27}$
- 5 R1

17.  $2 \overline{)11}$
- 6 R2

18.  $3 \overline{)20}$





Find the quotient on each note.

1.  $4 \div 4$  1

2.  $0 \div 5$  0

3.  $9 \div 3$  3

4.  $12 \div 2$  6

5.  $10 \div 2$  5

6.  $20 \div 4$  5

7.  $16 \div 2$  8

8.  $8 \div 4$  2

9.  $18 \div 2$  9

10.  $12 \div 2$  6

11.  $35 \div 5$  7

12.  $40 \div 5$  8

13.  $16 \div 4$  4

14.  $18 \div 3$  6

15.  $3 \div 3$  1

16.  $15 \div 3$  5

17.  $0 \div 3$  0

18.  $14 \div 2$  7

**Musical Mystery**  
Find the note with the largest quotient

241

## UNIT 13 PREVIEW

### Suggestions

Provide a blank grid as shown and have the students label it.

X	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45

Have students fill it in as fast as possible as a multiplication review.

Demonstrate how to use the chart to find quotients with divisors of 2, 3, 4, and 5. The divisors are in the left-hand column. For  $12 \div 4$ , locate 4 in the left-hand column, follow across the row to the dividend, and read the quotient at the top. Write the following on the chalkboard.

Sign	Operation	Answer
$3 + 5 = 8$	multiply	difference
$8 - 5 = 3$	add	sum
$3 \times 5 = 15$	divide	quotient
$15 \div 3 = 5$	subtract	product

Ask the students to match the 3 columns. Discuss the vocabulary of the four operations.

### About the Page

Have the students read aloud each division question before writing the quotients in their notebooks. Allow them to use the multiplication chart if needed. Question 9 is the musical mystery.

### Reinforcement

1. Have students work in pairs and ask each other division facts. Use the flash cards from Unit 8. Allow the use of the multiplication chart to help them solve the questions.

2. Write the following on the chalkboard.

How many 2s in 12? in 16?

How many 3s in 18? in 24?

How many 4s in 20? in 24?

How many 5s in 20? in 40?

Allow students to use counters on the multiplication chart to solve.

1.  $6 \overline{)24}$  4

20.  $7 \overline{)35}$  5

21.  $6 \overline{)54}$  9

22.  $7 \overline{)49}$  7

3.  $8 \overline{)32}$  4

24.  $8 \overline{)64}$  8

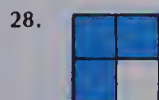
25.  $9 \overline{)27}$  3

26.  $9 \overline{)63}$  7

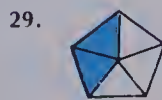
Colour the fraction part.



$\frac{1}{2}$



$\frac{3}{4}$



$\frac{2}{5}$



$\frac{7}{10}$

Colour the greater:  $\frac{3}{10}$  or  $\frac{5}{10}$ .



$\frac{9}{10}$

## Objective A50

Divide in vertical form with dividends to 45.

## Introducing the Lesson

Have the students label 10 blank cards with the digits from 0 to 9. Explain that these are the covered (or missing) factors. Hold up a covered factor card and ask them to hold up the digit card for the covered factor. Turn the covered factor card over to show the answer. Repeat with several more cards. (See the materials list and the Introduction to this unit.)

## Teaching the Lesson

Hand out the covered factor cards, 1 or 2 per student depending on the class size.

Hold up a division card.  $24 \div 3 = \text{[hand icon]}$

Ask the students to read it aloud and think of the quotient. Discuss how to solve by thinking, "How many 3s in 24 or  $\square \times 3 = 24$ ?" The student with the matching covered factor card, namely

$$\text{[hand icon]} \times 3 = 24$$

is to come up and take the division card.

Repeat with all the division flash cards.

Explain that there is another way to show division. Write  $15 \div 3 = 5$  on the chalkboard. "This is the horizontal way to write a division question." Write

$$\begin{array}{r} 5 \\ 3 \overline{)15} \end{array}$$

on the chalkboard. "This is the vertical way to write a division question." Read them as "15 divided by 3 equals 5 and 3 divided into 15 equals 5. To solve both divisions, think  $\square \times 3 = 15$ ."

Have the students match the following and read them aloud.

$$16 \div 8 = 2 \quad \begin{array}{r} 4 \\ 5 \overline{)20} \end{array}$$

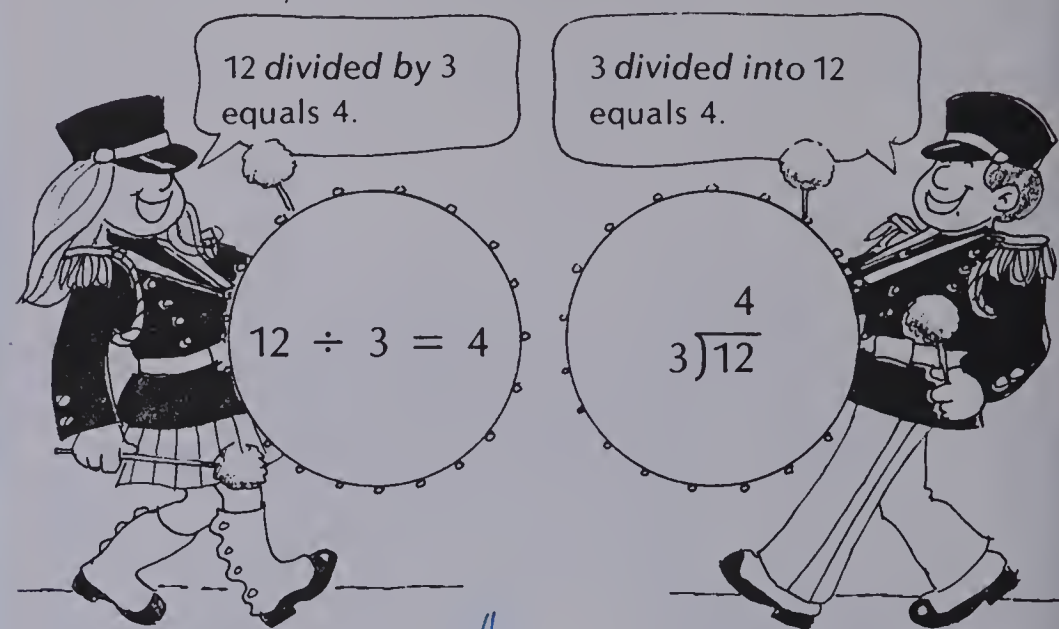
$$20 \div 5 = 4 \quad \begin{array}{r} 2 \\ 8 \overline{)16} \end{array}$$

$$18 \div 2 = 9 \quad \begin{array}{r} 9 \\ 2 \overline{)18} \end{array}$$

Note that the quotient is over the second digit in the dividend.

# Another Way to Show Division

There are two ways to show division.



To solve both divisions, think  $\text{[hand icon]} \times 3 = 12$ .

## EXERCISES

Rewrite each division using  $\overline{)}$ .

1.  $8 \div 2 = 4$   $\begin{array}{r} 4 \\ 2 \overline{)8} \end{array}$
2.  $6 \div 3 = 2$   $\begin{array}{r} 2 \\ 3 \overline{)6} \end{array}$
3.  $24 \div 4 = 6$   $\begin{array}{r} 6 \\ 4 \overline{)24} \end{array}$
4.  $10 \div 5 = 2$   $\begin{array}{r} 2 \\ 5 \overline{)10} \end{array}$
5.  $10 \div 2 = 5$   $\begin{array}{r} 5 \\ 2 \overline{)10} \end{array}$
6.  $5 \div 5 = 1$   $\begin{array}{r} 1 \\ 5 \overline{)5} \end{array}$

Rewrite each division using  $\overline{)}$ . Find the quotient.

7.  $24 \div 3$   $\begin{array}{r} 8 \\ 3 \overline{)24} \end{array}$
8.  $24 \div 4$   $\begin{array}{r} 6 \\ 4 \overline{)24} \end{array}$
9.  $25 \div 5$   $\begin{array}{r} 5 \\ 5 \overline{)25} \end{array}$
10.  $20 \div 5$   $\begin{array}{r} 4 \\ 5 \overline{)20} \end{array}$
11.  $20 \div 4$   $\begin{array}{r} 5 \\ 4 \overline{)20} \end{array}$
12.  $12 \div 4$   $\begin{array}{r} 3 \\ 4 \overline{)12} \end{array}$
13.  $12 \div 3$   $\begin{array}{r} 4 \\ 3 \overline{)12} \end{array}$
14.  $12 \div 2$   $\begin{array}{r} 6 \\ 2 \overline{)12} \end{array}$
15.  $18 \div 2$   $\begin{array}{r} 9 \\ 2 \overline{)18} \end{array}$

## Using the Exercises

- Questions 1 to 6 involve rewriting each division vertically. The quotients are given.
- Questions 7 to 15 involve rewriting each division vertically and finding the quotient.



## PRACTICE

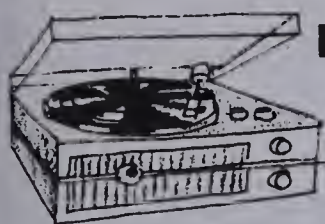
Choose four other names for each number.

1.	9
$18 \div 3$ 6	$45 \div 5$ 9
$27 \div 3$ 9	$24 \div 4$ 6
$18 \div 2$ 9	$36 \div 4$ 9

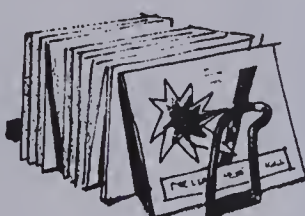
2.	6
$2 \overline{)12}$ 6	$3 \overline{)18}$ 6
$4 \overline{)20}$ 5	$5 \overline{)5}$ 1
$5 \overline{)30}$ 6	$4 \overline{)24}$ 6

3.	8
$4 \overline{)12}$ 3	$3 \overline{)18}$ 6
$3 \overline{)24}$ 8	$2 \overline{)16}$ 8
$5 \overline{)40}$ 8	$4 \overline{)32}$ 8

4.	4
$12 \div 3$ 4	$5 \overline{)20}$ 4
$16 \div 4$ 4	$8 \div 2$ 4
$4 \overline{)12}$ 3	$3 \overline{)9}$ 3



## Record Collection



Write a number sentence for each.

- 40 songs  
5 songs on each record  
How many records? 8
- 5 records  
7 songs on each record  
How many songs? 35
- 12 records  
2 in each album  
How many albums? 6
- 15 records  
3 in a stack  
How many stacks? 5

243

## Extra Practice

## Worksheet A50

Pages 242-243

vide.

- $3 \overline{)9}$
- $4 \overline{)12}$
- $4 \overline{)32}$
- $2 \overline{)8}$
- $5 \overline{)40}$
- $4 \overline{)16}$
- $2 \overline{)16}$
- $3 \overline{)24}$
- $5 \overline{)20}$
- $3 \overline{)12}$
- $4 \overline{)12}$
- $3 \overline{)18}$
- $4 \overline{)24}$
- $5 \overline{)30}$
- $4 \overline{)36}$
- $2 \overline{)18}$
- $4 \overline{)4}$
- $3 \overline{)27}$
- $5 \overline{)25}$
- $2 \overline{)12}$

## Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

## Reinforcement

1. Assign *Record Collection* on page 243. Encourage the students to draw a picture or use counters to help them solve the word problems.

2. For those who need concrete models to solve division, use an egg carton and beans.  $18 \div 2$  means how many 2s in 18? Count out 18 beans, divide them into groups of 2, and count up the number of groups.

3. Play "Musical Desks". One student starts by standing beside the desk of the nearest student who also stands. The teacher holds up a covered factor card for either one to answer out loud. The remaining students hold up the correct digit card from their pile. The student with the correct oral answer moves to the next desk, while the loser sits down. The winner is the child standing after all cards have been shown.

*Variation:* Use the division flash cards instead of the covered factor cards.

## Enrichment

1. Introduce the repeated subtraction method for solving division.

$$\begin{array}{r}
 18 \div 6 \quad 18 \text{ How many 6s were} \\
 \underline{-6} \quad \text{subtracted? 3} \\
 12 \\
 \underline{-6} \\
 6 \\
 \underline{-6} \\
 0
 \end{array}$$

2. Fact Families.

$$\begin{array}{ll}
 2 \times 8 = 16 & 16 \div 2 = 8 \\
 8 \times 2 = 16 & 16 \div 8 = 2
 \end{array}$$

This is a fact family for 2, 8, and 16. Write fact families for the following.

- a. 4, 9, 36   b. 5, 7, 35  
c. 3, 9, 27   d. 2, 6, 12

## Objective A51

Divide by sharing to find the number in each group, given the number of groups.

## Introducing the Lesson

Explain that today we are going to learn another meaning for division. We use this meaning when we deal out cards, form teams, or share a bag of candies among friends.

## Teaching the Lesson

**1. Dealing Cards.** (Take out the face cards and the jokers.) Deal 40 cards among 5 players until all the cards are shared. Ask how many players? (5) How many cards does each player get? (8) Demonstrate with 5 students. Write the division sentence to show this:

$$40 \div 5 = 8 \quad 5 \overline{)40} \quad 8$$

### 2. Forming Teams.

Divide 24 children into 4 teams by having them number off 1, 2, 3, 4; 1, 2, 3, 4; etc. Ask all the 1s to form Team 1, the 2s to form Team 2, the 3s to form Team 3, and the 4s to form Team 4. Ask how many teams? (4) How many students in each team? (6) Write the division sentence to show this:

$$24 \div 4 = 6 \quad 4 \overline{)24} \quad 6$$

### 3. Sharing Candies.

Share 30 candies with 6 children by giving one to each until all the candies are gone. Ask how many groups? (6) How many candies do they each get? (5) Write the division on the board:

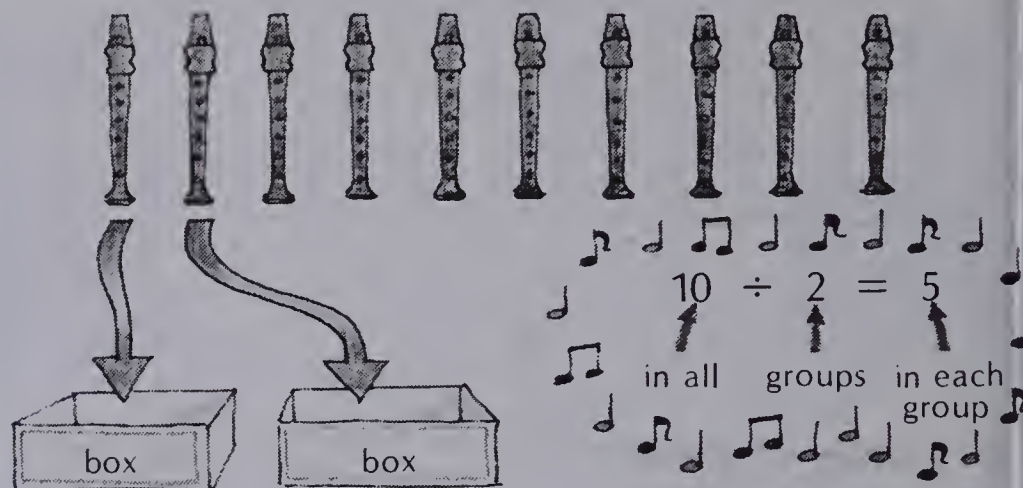
$$30 \div 6 = 5 \quad 6 \overline{)30} \quad 5$$

**4.** Discuss the dividing of recorders into 2 boxes as shown on page 244.

# Another Meaning for Division

10 recorders are divided between 2 boxes.

How many are in each box?

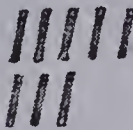

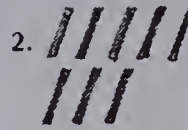

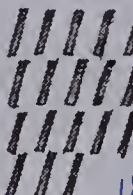

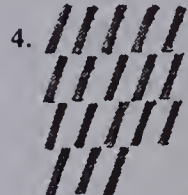



Division can tell how many are in each group.

## EXERCISES

How many drumsticks for each box?

Write an equation.

1.  	2.  
$8 \div 2 = 4$	$8 \div 4 = 2$
3.  	4.  
$18 \div 3 = 6$	$18 \div 2 = 9$

## Using the Exercises

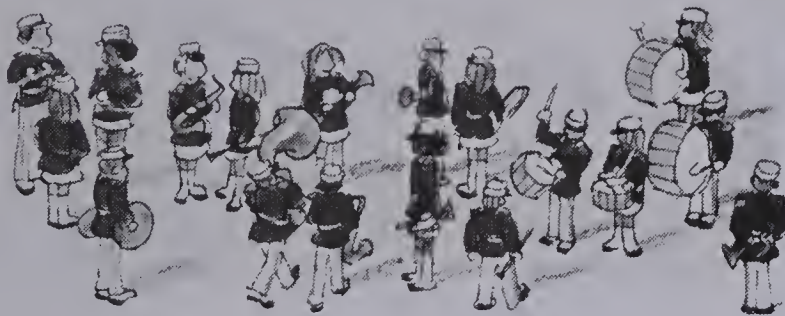
- Each of the 4 questions requires the student to divide the drumsticks into the given number of boxes to find how many drumsticks per box. Provide toothpicks as concrete models, if necessary. A division equation for each question is also required.



## PRACTICE

18 band students are lining up in equal rows.  
Draw a picture **and** write a division sentence to show how many will be in each row.

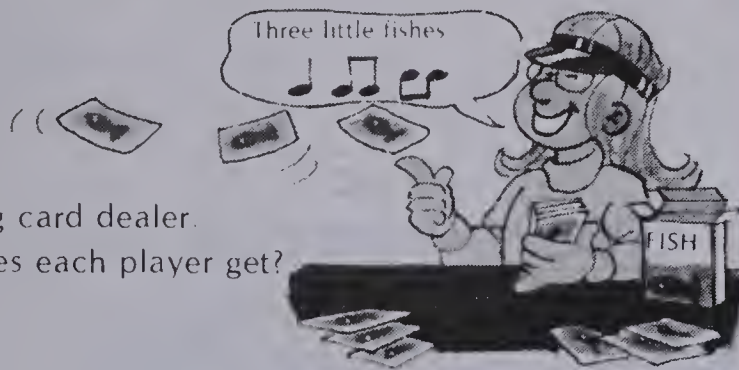
1. 2 rows  
 $18 \div 2 = 9$
2. 3 rows  
 $18 \div 3 = 6$
3. 6 rows  
 $18 \div 6 = 3$
4. 9 rows  
 $18 \div 9 = 2$



- Solve.
5. If 4 tuba players share 24 grapes, how many grapes will each player get? 6 grapes

## Dealing Cards

Harmony is a singing card dealer.  
How many cards does each player get?



Game	Number of cards	Number of players	Number of cards per player
1.	24	six	? <u>4</u>
2.	24	eight	? <u>3</u>
3.	28	seven	? <u>4</u>
4.	20	four	? <u>5</u>
5.	27	nine	? <u>3</u>

245

## Assigning the Practice

Minimum: 1-5  
Average: 1-5  
Enriched: 1-5

## Reinforcement

1. Assign *Dealing Cards* on page 245.
2. Use the same themes as on page 245 but change the numbers to make these questions for the students.
  - a. 24 band students to arrange in 4 rows, 6 rows, 3 rows, 8 rows.
  - b. Game 6: 30 cards, 6 players. How many cards per player?  
Game 7: 32 cards, 4 players. How many cards per player?

3. Provide several division questions for students to model using cards or counters.
 

$12 \div 4$ , means to share 12 cards among 4 people.

$16 \div 4$ , means to share 16 cards among 4 people.

$20 \div 5$ , means to share 20 cards among 5 people.

## Enrichment

Have the students fill in the notes.

$\begin{array}{r} 5 \\ 2 \overline{) 10} \end{array}$	$\begin{array}{r} 8 \\ 3 \overline{) 24} \end{array}$	$\begin{array}{r} 7 \\ 2 \overline{) 14} \end{array}$	$\begin{array}{r} 0 \\ 3 \overline{) 0} \end{array}$
$\begin{array}{r} 5 \\ 5 \overline{) 25} \end{array}$	$\begin{array}{r} 1 \\ 5 \overline{) 5} \end{array}$	$\begin{array}{r} 9 \\ 4 \overline{) 36} \end{array}$	$\begin{array}{r} 4 \\ 4 \overline{) 16} \end{array}$

## Extra Practice

## Worksheet A51

Pages 244-245

30 strings. 5 guitars.  
How many strings for each guitar? 6

32 strings. 8 violins.  
How many strings for each violin? 4

8 sticks. 4 drums.  
How many sticks for each drum? 2

15 pedals. 5 pianos.  
How many pedals for each piano? 3

# UNIT 13 LESSON 3

## Objective A52

Introduce remainders with dividends to 49.

## Introducing the Lesson

Write the following on the chalkboard and ask for the quotients.

$$30 \div 5 \quad 14 \div 2 \quad 3 \overline{)24} \quad 4 \overline{)32}$$

Review:

- how to read each question. 30 divided by 5
- what to think. *How many 5s in 30?*

## Teaching the Lesson

Write the following under the introductory examples.

$$32 \div 5 \quad 15 \div 2 \quad 3 \overline{)25} \quad 4 \overline{)35}$$

For each question, do the following:

- Ask, "What do you think?" *How many 5s in 32?*
- Use magnetic counters to model the problem.



- Ask, "How many groups of 5?"  
6 and 2 left over
- Write the quotient as 6R2.
- Read the quotient as "six remainder 2".

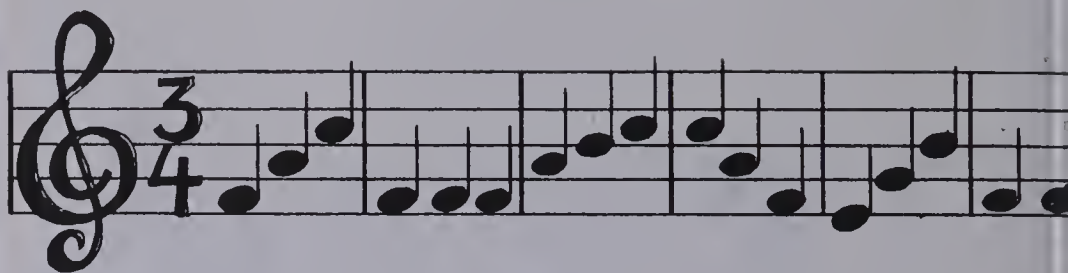
For the last 2 questions, include step 6.

- Write the long division format.

$$\begin{array}{r} 8 \\ 3 \overline{)25} \\ -24 \\ \hline 1 \end{array}$$

Discuss the example on page 246. Point out that when there is no remainder, we usually do not put R0.

# Remainders



15 notes grouped in threes

How many groups?

There are 5 groups of 3 notes and 0 left over.

$$15 \div 3 = 5 \text{ R } 0$$

$$\begin{array}{r} 5 \\ 3 \overline{)15} \\ -15 \\ \hline 0 \end{array}$$

17 notes grouped in threes

How many groups?

There are 5 groups of 3 notes and 2 left over.

$$17 \div 3 = 5 \text{ R } 2$$

$$\begin{array}{r} 5 \\ 3 \overline{)17} \\ -15 \\ \hline 2 \end{array}$$

The leftover is called the **remainder**.

## EXERCISES

Divide. Circle the questions with remainders.

- |                        |                             |                             |
|------------------------|-----------------------------|-----------------------------|
| 1. $20 \div 5$ 4       | 2. $21 \div 5$ 4 R1         | 3. $22 \div 5$ 4 R2         |
| 4. $23 \div 5$ 4 R3    | 5. $24 \div 5$ 4 R4         | 6. $25 \div 5$ 5            |
| 7. $3 \overline{)6}$   | 8. $3 \overline{)7}$ 2 R1   | 9. $3 \overline{)8}$ 2 R2   |
| 10. $4 \overline{)36}$ | 11. $4 \overline{)37}$ 9 R1 | 12. $4 \overline{)39}$ 9 R3 |

246

## Using the Exercises

- Questions 1 to 6 use the horizontal format.
- Questions 7 to 12 use the vertical format.
- Make sure that students divide first and then circle all the questions that have remainders.



## PRACTICE

Divide. Watch for remainders.

1.  $3 \overline{)22}$  <sup>7 R1</sup>
2.  $4 \overline{)23}$  <sup>5 R3</sup>
3.  $2 \overline{)9}$  <sup>4 R1</sup>
4.  $5 \overline{)12}$  <sup>2 R2</sup>
5.  $4 \overline{)28}$  <sup>7</sup>
6.  $3 \overline{)11}$  <sup>3 R2</sup>
7.  $5 \overline{)32}$  <sup>6 R2</sup>
8.  $2 \overline{)17}$  <sup>8 R1</sup>
9.  $0 \div 5$  <sup>0</sup>
10.  $6 \div 5$  <sup>1 R1</sup>
11.  $19 \div 4$  <sup>4 R3</sup>
12.  $36 \div 4$  <sup>9</sup>

Mr. Boom has 16 drums in his band.

How many complete rows of drums can he have?

13. 4 in each row <sup>4</sup>
14. 3 in each row <sup>5 R1</sup>
15. 2 in each row <sup>8</sup>
16. 1 in each row <sup>16</sup>
17. 5 in each row <sup>3 R1</sup>
18. 6 in each row <sup>2 R4</sup>

Ms. Tweet has 23 flutes in her band.

How many are left over when these rows are formed?

19. 3 in each row <sup>2</sup>
20. 7 in each row <sup>2</sup>

## \$ Money Matters \$

Jan has 25¢.

1. How much gum can she buy?  $3 \times 7¢ = 21¢$
2. What could she buy without change? <sup>5 popcorn</sup>
3. What purchase leaves her with 1¢ change? <sup>8 licorice</sup>
4. Why shouldn't Jan spend lots of money on candy?

*high dentist bills*



247

## Assigning the Practice

Minimum: 1-18

Average: 1-20

Enriched: 1-20

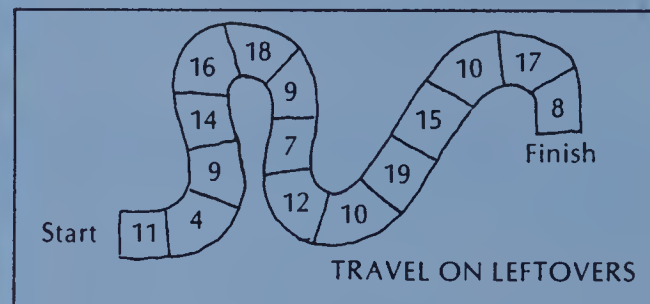
## Reinforcement

1. Provide 18 counters and an egg carton for each student. Ask the students to find how many 2s, 3s, 4s, and 5s in 18. Write the questions and answers on the chalkboard.

Repeat with 19 counters.

Repeat with 21 counters.

2. Play "Travel on Leftovers". Provide a game board like the following and a die with the numbers 0 to 5.



2 to 4 players.

Roll the die and divide that number into 11. If there is a remainder, move the marker that many spaces. On the next roll, divide the number on the die into the number you are on and only Travel on the Leftover. The winner is the first person to reach the finish.

## Enrichment

1. Assign *Money Matters* on page 247. Questions 2, 3, and 4 can have a variety of answers. For example, for 2

2 gum, 2 licorice, 1 popcorn = 25¢

5 popcorn = 25¢

1 gum, 1 licorice, 3 popcorn = 25¢

2. What is the largest remainder that a divisor of:

a. 2 can have? *Hint:* Divide 2 into 10, 11, 12, and 13.

b. 3 can have? *Hint:* Divide 3 into 15, 16, 17, 18, 19, 20, and 21.

c. 4 can have? *Hint:* Divide 4 into 24, 25, 26, 27, and 28.

d. 5 can have? *Hint:* Divide 5 into 30, 31, 32, 33, 34, and 35.

## Extra Practice

## Worksheet A52

Pages 246-247

Divide. Show the remainder if there is one.

1.  $4 \overline{)17}$  <sup>4 R1</sup>
2.  $3 \overline{)11}$  <sup>3 R2</sup>
3.  $5 \overline{)28}$  <sup>5 R3</sup>
4.  $2 \overline{)9}$  <sup>4 R1</sup>
5.  $3 \overline{)19}$  <sup>6 R1</sup>
6.  $5 \overline{)42}$  <sup>8 R2</sup>
7.  $2 \overline{)15}$  <sup>7 R1</sup>
8.  $4 \overline{)24}$  <sup>6</sup>
9.  $5 \overline{)39}$  <sup>7 R4</sup>
10.  $4 \overline{)34}$  <sup>8 R2</sup>
11.  $3 \overline{)23}$  <sup>7 R2</sup>
12.  $2 \overline{)19}$  <sup>9 R1</sup>

## Objective A53

Divide by 6 and 7 with dividends to 63.

## Introducing the Lesson

Have a 5-minute oral drill of the 6 and 7 times tables.

Make sure all the students have a set of digit cards from 0 to 9. Hold up a covered factor card and ask students to think of the covered factor. At your signal (a tap) the students hold up the digit card for the covered factor. Turn each covered factor card over to check the answer.

## Teaching the Lesson

Hold up a division flash card.

$$42 \div 6 = \text{[hand card]}$$

Ask the students what they should think to solve it, namely, "How many 6s in 42?" Ask a volunteer to locate the matching covered factor card

$$\text{[hand card]} \times 6 = 42$$

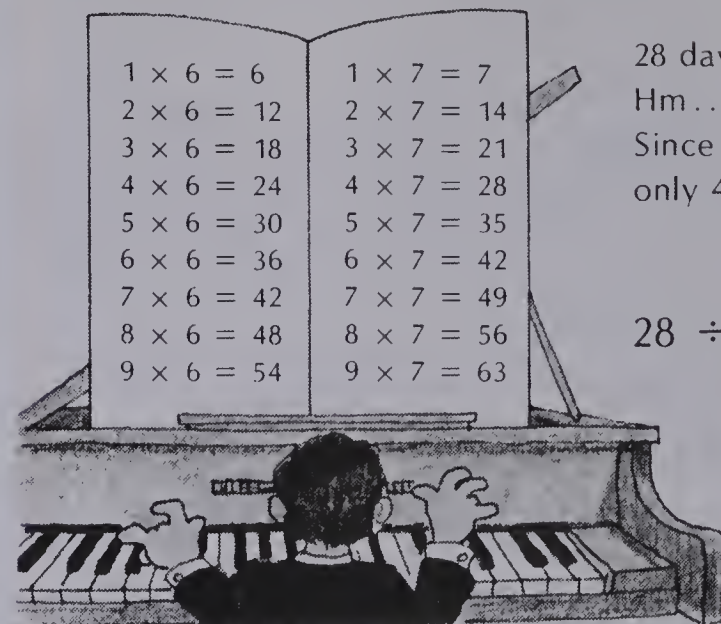
. The rest of the students should be solving it. At your signal have the students hold up the digit card for the quotient. Turn the division flash card over to check the answer.

Repeat with several more division flash cards with divisors of 6.

Repeat using flash cards with divisors of 7.

Discuss the example at the top of page 248.

# Dividing by 6 and 7



28 days to my piano concert.  
Hm...m...7 days in a week.  
Since  $4 \times 7 = 28$ , I have only 4 weeks left.

$$28 \div 7 = 4 \quad 7 \overline{)28} \quad 4$$

## EXERCISES

Use the multiplication tables above to help you complete these.

1.  $\text{[hand card]} \times 6 = 36$   
 $36 \div 6 = \text{[hand card]} 6$
2.  $\text{[hand card]} \times 6 = 42$   
 $42 \div 6 = \text{[hand card]} 7$
3.  $\text{[hand card]} \times 6 = 48$   
 $48 \div 6 = \text{[hand card]} 8$
4.  $\begin{array}{r} 6 \\ \times \text{[hand card]} 5 \\ \hline 30 \end{array}$   $6 \overline{)30}$
5.  $\begin{array}{r} 6 \\ \times \text{[hand card]} 0 \\ \hline 0 \end{array}$   $6 \overline{)0}$
6.  $\begin{array}{r} 6 \\ \times \text{[hand card]} 3 \\ \hline 18 \end{array}$   $6 \overline{)18}$
7.  $\text{[hand card]} \times 7 = 35$   
 $35 \div 7 = \text{[hand card]} 5$
8.  $\text{[hand card]} \times 7 = 42$   
 $42 \div 7 = \text{[hand card]} 6$
9.  $\text{[hand card]} \times 7 = 49$   
 $49 \div 7 = \text{[hand card]} 7$
10.  $\begin{array}{r} 7 \\ \times \text{[hand card]} 8 \\ \hline 56 \end{array}$   $7 \overline{)56}$
11.  $\begin{array}{r} 7 \\ \times \text{[hand card]} 9 \\ \hline 63 \end{array}$   $7 \overline{)63}$
12.  $\begin{array}{r} 7 \\ \times \text{[hand card]} 1 \\ \hline 7 \end{array}$   $7 \overline{)7}$

## Using the Exercises

- Questions 1 to 6 relate the 6 times tables to the corresponding division sentences. Remind students to read vertical multiplication questions from bottom to top.
- Questions 7 to 12 relate the 7 times tables to the corresponding division sentences.



## PRACTICE

Divide. Use the multiplication tables to help you.

1.  $6 \overline{)12}$   $2$
2.  $6 \overline{)30}$   $5$
3.  $6 \overline{)18}$   $3$
4.  $6 \overline{)24}$   $4$
5.  $7 \overline{)28}$   $4$
6.  $7 \overline{)21}$   $3$
7.  $7 \overline{)14}$   $2$
8.  $7 \overline{)42}$   $6$
9.  $6 \overline{)42}$   $7$
10.  $6 \overline{)43}$   $7 \text{ R}1$
11.  $7 \overline{)35}$   $5$
12.  $7 \overline{)37}$   $5 \text{ R}2$
13.  $6 \overline{)48}$   $8$
14.  $7 \overline{)63}$   $9$
15.  $7 \overline{)56}$   $8$
16.  $6 \overline{)54}$   $9$
17.  $7 \overline{)49}$   $7$
18.  $6 \overline{)36}$   $6$
19.  $6 \overline{)15}$   $2 \text{ R}3$
20.  $7 \overline{)12}$   $1 \text{ R}5$

How many weeks? How many extra days?

21. 16 days  $2 \text{ weeks } 2 \text{ days}$
22. 36 days  $5 \text{ weeks } 1 \text{ day}$
23. 30 days  $4 \text{ weeks } 2 \text{ days}$
24. 54 days  $7 \text{ weeks } 5 \text{ days}$

## REVIEW

- A50 Rewrite using  $\overline{)}$ . Find the quotient.
1.  $14 \div 2$   $2 \overline{)14}$
  2.  $21 \div 3$   $3 \overline{)21}$
  3.  $25 \div 5$   $5 \overline{)25}$
  4.  $17 \div 3$   $5 \overline{)17} \text{ R}2$

- A51 Write a division equation.
5.  $8 \div 2 = 4$
  6.  $6 \div 3 = 2$

- A52 Divide.
7.  $5 \overline{)22}$   $4 \text{ R}2$
  8.  $3 \overline{)16}$   $5 \text{ R}1$
  9.  $2 \overline{)19}$   $9 \text{ R}1$
  10.  $4 \overline{)26}$   $6 \text{ R}2$
  11.  $6 \overline{)6}$   $1$
  12.  $7 \overline{)14}$   $2$
  13.  $6 \overline{)54}$   $9$
  14.  $7 \overline{)49}$   $7$
  15.  $7 \overline{)7}$   $1$
  16.  $6 \overline{)18}$   $3$
  17.  $7 \overline{)36}$   $5 \text{ R}1$
  18.  $6 \overline{)38}$   $6 \text{ R}2$

249

## Assigning the Practice

Minimum: 1-20

Average: 1-24

Enriched: 1-24

Remind students that some questions will have remainders.

## Review Exercises

Questions	Objective	Pages
1-4	A50	242-243
5-6	A51	244-245
7-10	A52	246-247
11-18	A53	248-249

## Reinforcement

1. Have individual students match the covered factor cards to the division flash cards.

2. Have pairs of students drill each other with the division flash cards.

## Enrichment

1. Have the students write  $\times$  or  $\div$  to complete this worksheet.

$9 \square 6 = 54$

$28 \square 7 = 4$

$1 \square 7 = 7$

$6 \square 6 = 1$

$7 \square 1 = 7$

$0 \square 6 = 0$

$4 \square 6 = 24$

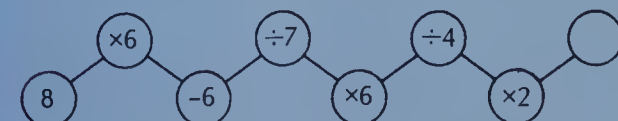
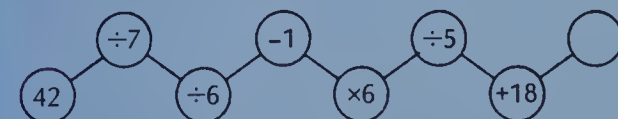
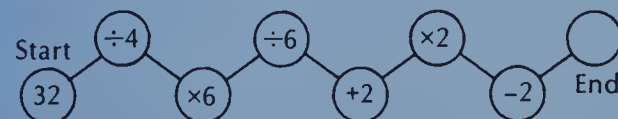
$30 \square 6 = 5$

Challenge: Which 2 questions can be completed with either  $\times$  or  $\div$ ?

Answer: ( $7 \square 1 = 7$ ,  $0 \square 6 = 0$ )

Variation: Make up 5 of your own questions like these and ask another student to answer them.

2. Ask the students to follow each path to find the end number.



The answer is 18 for each path.

## Extra Practice

## Worksheet A53

Pages 248-249

- Divide.
1.  $6 \overline{)54}$   $9$
  2.  $7 \overline{)56}$   $8$
  3.  $7 \overline{)63}$   $9$
  4.  $6 \overline{)48}$   $8$
  5.  $7 \overline{)35}$   $5$
  6.  $6 \overline{)42}$   $7$
  7.  $7 \overline{)14}$   $2$
  8.  $7 \overline{)49}$   $7$
  9.  $6 \overline{)36}$   $6$
  10.  $6 \overline{)30}$   $5$
  11.  $7 \overline{)42}$   $6$
  12.  $6 \overline{)12}$   $2$
  13.  $6 \overline{)24}$   $4$
  14.  $7 \overline{)21}$   $3$
  15.  $6 \overline{)18}$   $3$
  16.  $7 \overline{)28}$   $4$
  17.  $7 \overline{)53}$   $7 \text{ R}4$
  18.  $6 \overline{)39}$   $6 \text{ R}3$
  19.  $7 \overline{)13}$   $1 \text{ R}6$
  20.  $6 \overline{)5}$   $0 \text{ R}5$

## Objective A54

Divide by 8 and 9 with dividends to 81.

## Introducing the Lesson

Have a five-minute, oral drill of the 8 and 9 times tables.

Hold up a covered factor card and ask students to think of the covered factor. At your signal, the students hold up the digit card for the covered factor. Turn each covered factor card over to check the answer.

## Teaching the Lesson

Hold up a division flash card with a divisor of 8.

$$40 \div 8 = \text{[hand card]}$$

Ask, "How many 8s in 40?" Have a volunteer locate the matching covered factor card while the rest of the students find the quotient among their digit cards.

$$\text{[hand card]} \times 8 = 40$$

At your signal, ask the students to hold up the digit card for the quotient. Turn the division flash card over to check the answer.

Repeat with several more divisors of 8.

Repeat with divisors of 9.

Discuss the example at the top of page 250.

# Dividing by 8 and 9

$$\begin{array}{ll} 0 \times 8 = 0 & 1 \times 8 = 8 \\ 2 \times 8 = 16 & 3 \times 8 = 24 \\ 4 \times 8 = 32 & 5 \times 8 = 40 \\ 6 \times 8 = 48 & 7 \times 8 = 56 \\ 8 \times 8 = 64 & 9 \times 8 = 72 \end{array}$$

$$\begin{array}{ll} 0 \times 9 = 0 & 1 \times 9 = 9 \\ 2 \times 9 = 18 & 3 \times 9 = 27 \\ 4 \times 9 = 36 & 5 \times 9 = 45 \\ 6 \times 9 = 54 & 7 \times 9 = 63 \\ 8 \times 9 = 72 & 9 \times 9 = 81 \end{array}$$



## EXERCISES

Copy and complete.

1.  $\begin{array}{r} 7 \\ \blacksquare \times 8 = 56 \\ 56 \div 8 = \blacksquare 7 \end{array}$
2.  $\begin{array}{r} 9 \\ \blacksquare \times 8 = 72 \\ 72 \div 8 = \blacksquare 9 \end{array}$
3.  $\begin{array}{r} 8 \\ \blacksquare \times 8 = 64 \\ 64 \div 8 = \blacksquare 8 \end{array}$
4.  $\begin{array}{r} 8 \\ \times \blacksquare 5 \\ \hline 40 \end{array}$      $8 \overline{)40}$
5.  $\begin{array}{r} 8 \\ \times \blacksquare 6 \\ \hline 48 \end{array}$      $8 \overline{)48}$
6.  $\begin{array}{r} 8 \\ \times \blacksquare 4 \\ \hline 32 \end{array}$      $8 \overline{)32}$
7.  $\begin{array}{r} 8 \\ \blacksquare \times 9 = 72 \\ 72 \div 9 = \blacksquare 8 \end{array}$
8.  $\begin{array}{r} 4 \\ \blacksquare \times 9 = 36 \\ 36 \div 9 = \blacksquare 4 \end{array}$
9.  $\begin{array}{r} 7 \\ \blacksquare \times 9 = 63 \\ 63 \div 9 = \blacksquare 7 \end{array}$
10.  $\begin{array}{r} 9 \\ \times \blacksquare 9 \\ \hline 81 \end{array}$      $9 \overline{)81}$
11.  $\begin{array}{r} 9 \\ \times \blacksquare 3 \\ \hline 27 \end{array}$      $9 \overline{)27}$
12.  $\begin{array}{r} 9 \\ \times \blacksquare 2 \\ \hline 18 \end{array}$      $9 \overline{)18}$

## Using the Exercises

- Questions 1 to 6 relate the 8 times tables to the corresponding division sentences.
- Questions 7 to 12 relate the 9 times tables to the corresponding division sentences.



## PRACTICE

Find the quotient.

1.  $8 \overline{)56} \quad 7$
2.  $8 \overline{)57} \quad 7 \text{ R}1$
3.  $8 \overline{)24} \quad 3$
4.  $8 \overline{)32} \quad 4$
5.  $8 \overline{)72} \quad 9$
6.  $8 \overline{)64} \quad 8$
7.  $8 \overline{)67} \quad 8 \text{ R}3$
8.  $8 \overline{)70} \quad 8 \text{ R}6$
9.  $16 \div 8 \quad 2$
10.  $0 \div 8 \quad 0$
11.  $48 \div 8 \quad 6$
12.  $40 \div 8 \quad 5$
13.  $9 \overline{)81} \quad 9$
14.  $9 \overline{)72} \quad 8$
15.  $9 \overline{)63} \quad 7$
16.  $9 \overline{)65} \quad 7 \text{ R}2$
17.  $9 \overline{)45} \quad 5$
18.  $9 \overline{)36} \quad 4$
19.  $9 \overline{)39} \quad 4 \text{ R}3$
20.  $9 \overline{)27} \quad 3$
21.  $18 \div 9 \quad 2$
22.  $9 \div 9 \quad 1$
23.  $0 \div 9 \quad 0$
24.  $10 \div 9 \quad 1 \text{ R}1$

Solve.

25. There are 36 children in the dancing class.  
There are 9 groups of equal size.  
How many children are in each group?  $4$

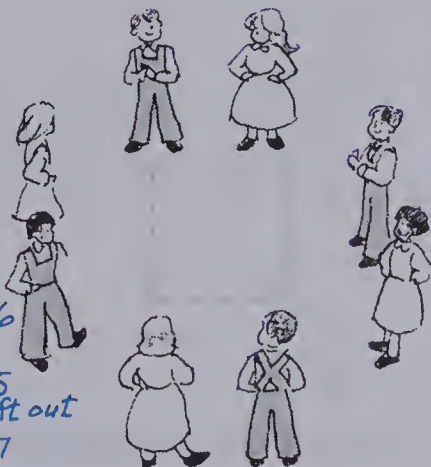
## Swing Your Partner

For square dancing, 4 pairs of students are needed.

How many squares can be made from each group of students?

How many students are left out?

1. 40 students  $5$
2. 48 students  $6$
3. 72 students  $9$
4. 44 students  $5$   
 $4 \text{ left out}$
5. 50 students  $6$   
 $2 \text{ left out}$
6. 60 students  $7$   
 $4 \text{ left out}$



251

## Assigning the Practice

Minimum: 1-25

Average: 1-25

Enriched: 1-25

Remind the students that some questions will have remainders.

## Reinforcement

1. Continue with the basic facts drill program using the Division Fact Master outlined in the Ideas section.

2. Complete the tables.

$\div 8$
0
16
40
56
64

$\div 9$
9
27
45
72
81

## Enrichment

1. Assign *Swing Your Partner* on page 251.

2. Provide work cards like the following.

7	12	14	21	35
Which numbers above can be divided by 2? by 7? by both 2 and 7?				

Answers on  
back of cards.

(12, 14)  
(7, 14, 21, 35)  
(14)

0	18	24	56	72
Which numbers above can be divided by 8? by 9? by both 8 and 9?				

(0, 24, 56, 72)  
(0, 18, 72)  
(0, 72)

## Extra Practice

## Worksheet A54

Pages 250-251

Divide.

1.  $8 \overline{)32} \quad 4$
2.  $9 \overline{)18} \quad 2$
3.  $8 \overline{)48} \quad 6$
4.  $9 \overline{)81} \quad 9$
5.  $9 \overline{)27} \quad 3$
6.  $8 \overline{)40} \quad 5$
7.  $9 \overline{)63} \quad 7$
8.  $8 \overline{)64} \quad 8$
9.  $8 \overline{)72} \quad 9$
10.  $9 \overline{)36} \quad 4$
11.  $9 \overline{)72} \quad 8$
12.  $8 \overline{)56} \quad 7$
13.  $8 \overline{)16} \quad 2$
14.  $9 \overline{)45} \quad 5$
15.  $8 \overline{)24} \quad 3$
16.  $9 \overline{)54} \quad 6$
17.  $8 \overline{)52} \quad 6 \text{ R}4$
18.  $9 \overline{)40} \quad 4 \text{ R}4$
19.  $9 \overline{)17} \quad 1 \text{ R}8$
20.  $8 \overline{)78} \quad 9 \text{ R}6$

## Objective N10

Write a fraction for the shaded part of a region.

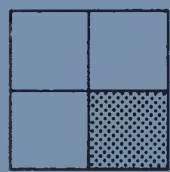
## Introducing the Lesson

Ask the students to fold sheets of paper in half, then fold again, and again. Then ask them to unfold and tell how many equal parts the paper has.

They can colour one part (or more). Ask how many parts are coloured and how many parts there are in all. Tell them that we say that a fraction of the whole paper is coloured. In this lesson, we are going to learn how to write fractions using numerals.

## Teaching the Lesson

Sketch a square on the board. Divide the square into four equal parts. Ask the students how many parts? Are the parts the same size? Tell the students the square is separated into fourths. Shade in one part and develop the following.



1 part shaded.  
4 parts same size.  
“ $\frac{1}{4}$  is shaded,” or,  
“One fourth is shaded.”

Repeat the above to illustrate  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $\frac{1}{3}$ ,  $\frac{2}{3}$ ,  $\frac{4}{5}$ , etc.

Give each student a paper with the following grids and have them shade in  $\frac{2}{3}$ ,  $\frac{3}{4}$ ,  $\frac{3}{5}$ ,  $\frac{7}{10}$ .



Make a chart to show the words for fractions. For example:

$\frac{1}{4}$  → one fourth  
 $\frac{3}{4}$  → three fourths  
 $\frac{1}{3}$  → one third  
 $\frac{2}{3}$  → two thirds  
 $\frac{1}{5}$  → one fifth  
 $\frac{2}{5}$  → two fifths

# Fractions

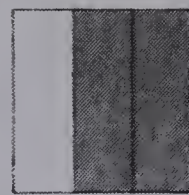
What fraction of the whole is shaded?



1 part is shaded.  
4 parts, the same size

$\frac{1}{4}$  is shaded.

One fourth is shaded.



2 parts are shaded.  
3 parts, the same size

$\frac{2}{3}$  is shaded

Two thirds is shaded.

Copy and complete each answer

1. 1 parts shaded  
3 parts, the same size  
 $\frac{1}{3}$  of the whole is shaded.
2. 3 parts shaded  
4 parts, the same size  
 $\frac{3}{4}$  of the whole is shaded.

3.  $\frac{1}{3}$
4.  $\frac{3}{5}$
5.  $\frac{4}{10}$
6.  $\frac{4}{5}$
7.  $\frac{1}{2}$
8.  $\frac{3}{10}$

252

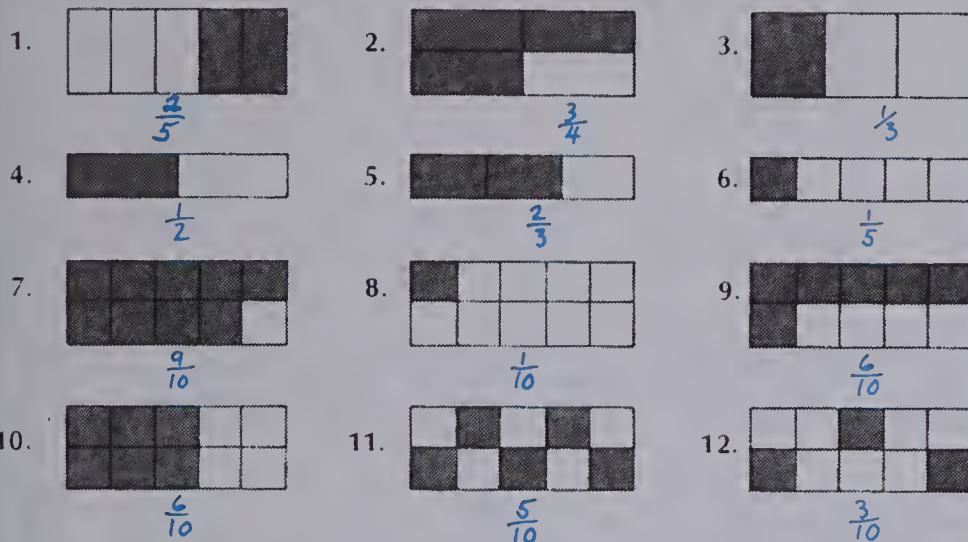
## Using the Exercises

- Work with the students on questions 1 and 2 to be sure they understand the correct format for fractions. Make sure the numerators and denominators (call them tops and bottoms) are in the right places.
- Questions 3 to 5 require the students to complete the correct number of shaded parts. The denominators are given.
- Questions 6 to 8 require the students to find the total number of parts in the whole. The shaded parts (numerators) are given.



## PRACTICE

What fraction of the whole is shaded?

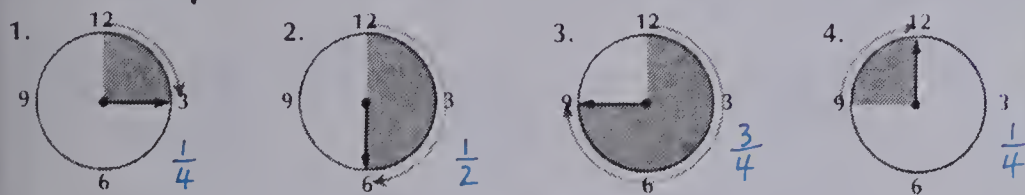


Write the fraction

- |                              |                                 |                              |
|------------------------------|---------------------------------|------------------------------|
| 13. one third $\frac{1}{3}$  | 14. three fourths $\frac{3}{4}$ | 15. one half $\frac{1}{2}$   |
| 16. two fifths $\frac{2}{5}$ | 17. four tenths $\frac{4}{10}$  | 18. one tenth $\frac{1}{10}$ |

## Thinking Part-time

What fraction of an hour has the minute hand moved?



Write the time.

- |   |  |
|---|--|
| 5. half past three 3:30                     | 6. half past ten 10:30                   |
| 7. quarter ( $\frac{1}{4}$ ) past five 5:15 | 8. quarter ( $\frac{1}{4}$ ) to six 5:45 |

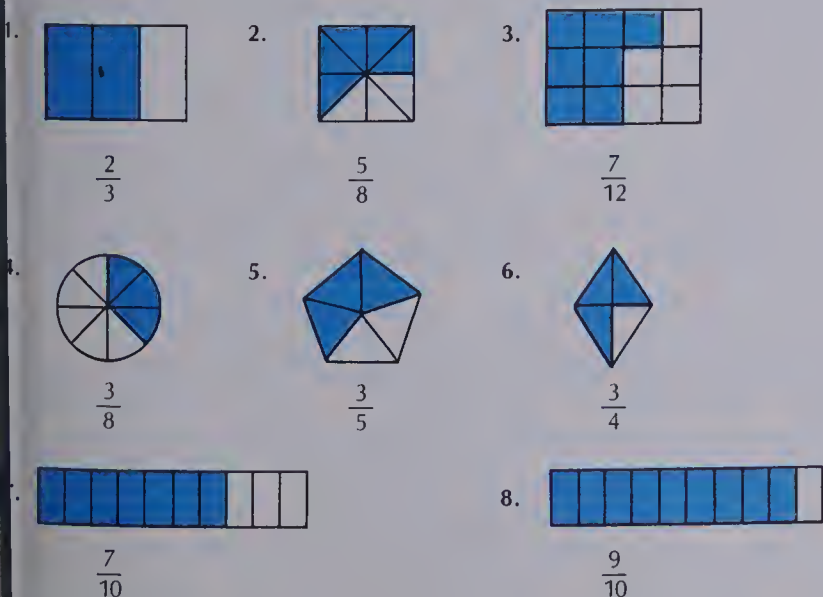
253

## Extra Practice

## Worksheet N10

Pages 252-253

shade in the fraction part shown.



## Assigning the Practice

Minimum: 1-10

Average: 1-18

Enriched: 1-18

## Reinforcement

Students can make a game of "Concentration" involving fraction cards. One set of cards is labelled with fractions. Another set of cards the same size is split into parts and shaded so that each card represents a fraction in the other set.

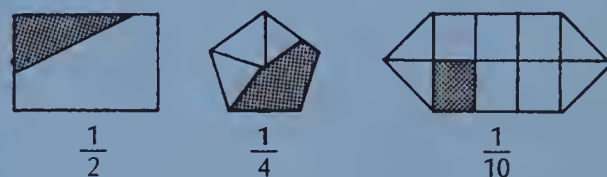


The cards are shuffled together and placed face down at random. Students turn up 2 cards at a time to find matching pairs.

## Enrichment

1. Assign *Thinking Part-time* on page 253.

2. To emphasize that fraction parts must represent equal parts of a whole, ask why the following do not represent the fraction shown!



Ask students to draw *proper* pictures for these fractions.

3. Discuss musical notes.



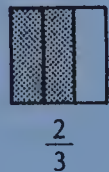
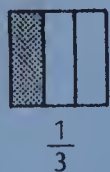
The half note and quarter note are not half (or one quarter) the size of the whole note. In what way are they a fraction of the whole note? (Time value.)

## Objective N11

Compare two fractions with the same denominators.

## Introducing the Lesson

Sketch two squares on the board. Divide each square into three equal parts. Have one student shade in one third on the first square, and another student shade in two thirds on the second square. Ask, "Which is greater  $\frac{1}{3}$  or  $\frac{2}{3}$ ?"



Conclude that  $\frac{2}{3}$  is greater than  $\frac{1}{3}$ .

Point out that " $\frac{1}{3}$  is less than  $\frac{2}{3}$ " is the same as saying " $\frac{2}{3}$  is greater than  $\frac{1}{3}$ ".

Repeat the above steps to compare;  $\frac{1}{4}$  and  $\frac{2}{4}$ ,  $\frac{2}{4}$  and  $\frac{3}{4}$ ,  $\frac{4}{5}$  and  $\frac{3}{5}$ ,  $\frac{7}{10}$  and  $\frac{3}{10}$ .

Draw the following on the board. Have students compare the shaded regions and draw a conclusion.



## Teaching the Lesson

Refer to the example at the top of page 254.

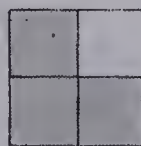
Draw the students' attention to the "bottom part" of each fraction. (You may wish to introduce the terms *numerator* and *denominator* but it is not essential at this level.) Note that the bottom part is the same.

3 fourths is greater than 1 fourth because  $3 > 1$ .

1 fourth is less than 3 fourths because  $1 < 3$ .

Conclude that, if the bottom parts are the same, we just compare the top parts of fractions in order to determine the smaller or larger fraction.

# Comparing Fractions



$\frac{3}{4}$  of the square is blue.

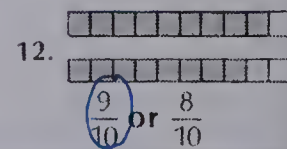
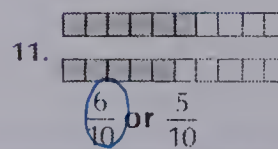
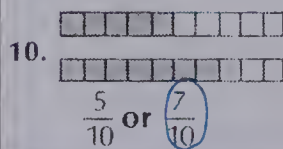
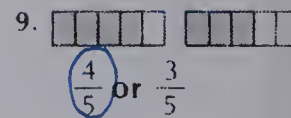
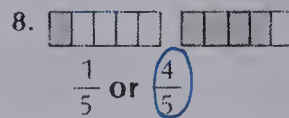
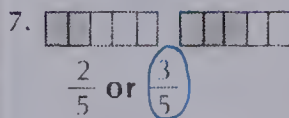
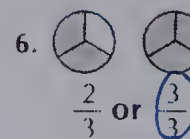
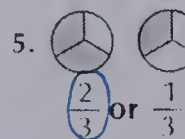
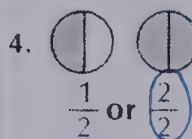
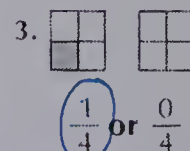
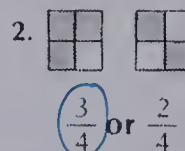
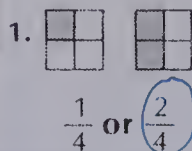


$\frac{1}{4}$  of the square is blue.

$\frac{1}{4}$  is less than  $\frac{3}{4}$ .  $\frac{3}{4}$  is greater than  $\frac{1}{4}$ .

## EXERCISES

Write the greater fraction.



## Using the Exercises

- All the questions give pictorial aids in order to make the comparisons. Give a few examples without pictures to determine whether students have the right idea. Then assign the Practice.



## PRACTICE

Write the greater fraction.

1.  $\frac{3}{5}$  or  $\frac{4}{5}$

2.  $\frac{3}{4}$  or  $\frac{1}{4}$

3.  $\frac{2}{3}$  or  $\frac{1}{3}$

4.  $\frac{1}{4}$  or  $\frac{2}{4}$

5.  $\frac{2}{5}$  or  $\frac{4}{5}$

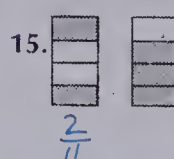
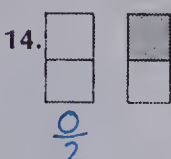
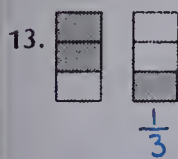
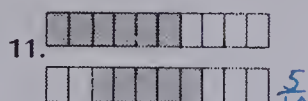
6.  $\frac{7}{10}$  or  $\frac{3}{10}$

7.  $\frac{6}{10}$  or  $\frac{9}{10}$

8.  $\frac{2}{10}$  or  $\frac{1}{10}$

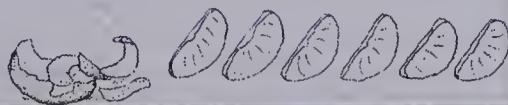
9.  $\frac{1}{2}$  or  $\frac{0}{2}$

Write a fraction for the smaller portion.



Solve.

16. Reed ate  $\frac{2}{3}$  of an orange.  
Mandy ate the rest.  
Who ate the most? **Reed**



## Assigning the Practice

Minimum: 1-9

Average: 1-15

Enriched: 1-16

## Reinforcement

1. If students have difficulty with questions 1 to 9 of the Practice section, have them draw pictures to represent the fractions in each question.

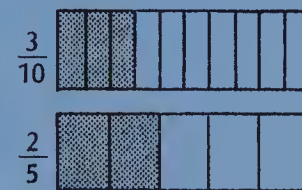
2. Have students write mathematical statements about the fractions in questions 1 to 9 using *less than* and *greater than* symbols. Example:

1.  $\frac{3}{5} < \frac{4}{5}$

## Enrichment

1. Assign *Working Over-time* on page 255.

2. Give students questions involving comparison of fractions with different denominators. Have them draw diagrams to help with the comparisons. Example: Which is greater:  $\frac{3}{10}$  or  $\frac{2}{5}$ ?

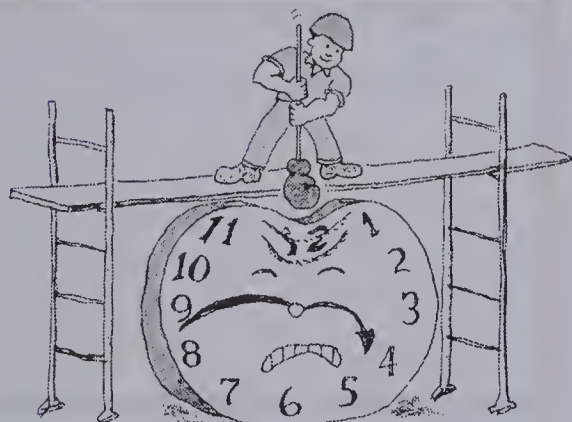


$\frac{2}{5} > \frac{3}{10}$

## Working Over-time

Which is later?

- 9:00 or half past nine
- 7:00 or quarter to seven
- 4:00 or quarter past four
- 2:00 or quarter to two



255

## Extra Practice

## Worksheet N11

Pages 254-255

Circle the greater fraction.

1.  $\frac{1}{3}$  or  $\frac{2}{3}$

2.  $\frac{4}{5}$  or  $\frac{3}{5}$

3.  $\frac{4}{8}$  or  $\frac{3}{8}$

4.  $\frac{2}{4}$  or  $\frac{3}{4}$

5.  $\frac{3}{8}$  or  $\frac{5}{8}$

6.  $\frac{5}{6}$  or  $\frac{3}{6}$

7.  $\frac{7}{10}$  or  $\frac{3}{10}$

8.  $\frac{5}{10}$  or  $\frac{9}{10}$

9.  $\frac{6}{10}$  or  $\frac{4}{10}$

Rewrite the following using less than.

$\frac{3}{4}$  is greater than  $\frac{1}{4}$ .  $\frac{1}{4}$  is less than  $\frac{3}{4}$ .

$\frac{7}{10}$  is greater than  $\frac{3}{10}$ .  $\frac{3}{10}$  is less than  $\frac{7}{10}$ .

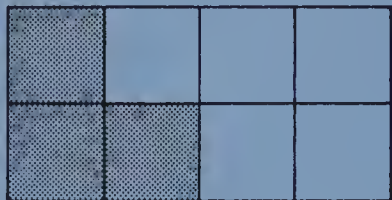
$\frac{3}{5}$  is greater than  $\frac{2}{5}$ .  $\frac{2}{5}$  is less than  $\frac{3}{5}$ .

## Objective N12

Write the fraction for part of a set.

### Introducing the Lesson

Show a partly coloured grid like the following.



Ask, "What fraction of the grid is coloured?" ( $\frac{3}{8}$ ) Cut the grid along the lines so that there are 8 pieces. Ask how many pieces there are. Ask how many are coloured. Explain that we use fractions to make statements about parts of a set like this.

We say,  $\frac{3}{8}$  of the pieces are coloured.

### Teaching the Lesson

Refer to the top of page 256 and read the lesson example together. Ask what fraction of the records are *not* broken.

$$\left(\frac{3}{5}\right)$$

Use counters of different colours and have the students make sets of counters. Then have them make fraction statements about the sets.

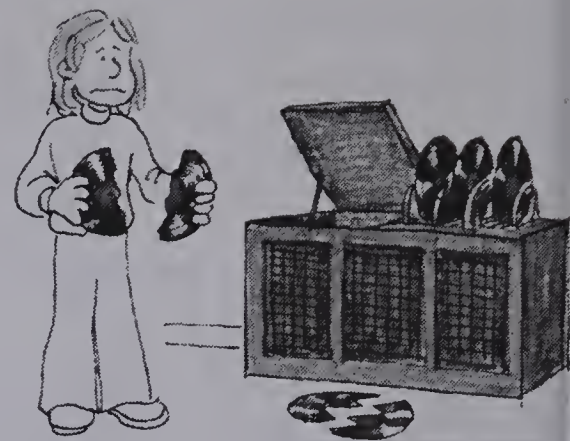
Example:

10 counters

3 are red

$\frac{3}{10}$  of the counters are red

## Fractions of a Set



5 records in all

2 are broken.

$\frac{2}{5}$  of the records are broken.

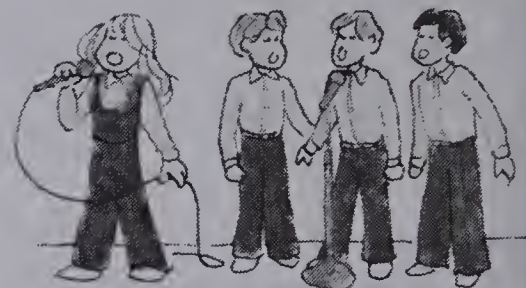
### EXERCISES

Complete each answer.

1. 4 ■ singers in all

1 ■ is a girl.

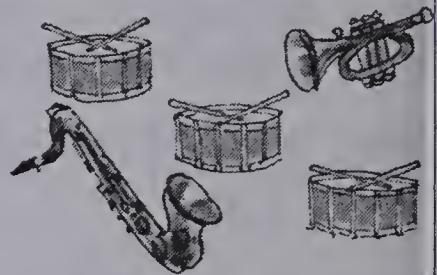
$\frac{1}{4}$  of the singers are girls.



2. 5 ■ instruments in all

3 ■ are drums.

$\frac{3}{5}$  of the instruments are drums.



3. 10 piano keys in all

5 ■ are black.

$\frac{5}{10}$  of the keys are black.





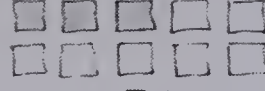
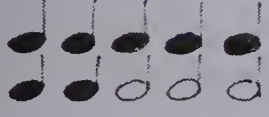
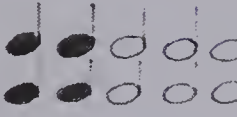

### Using the Exercises

- In questions 1 and 2, the denominators are given.
- Work with the students on question 3. Count out the total number of keys. Make sure they realize that this is the bottom part of the fraction. Then count the black keys to determine the top part.
- Note: In question 3, the keys are not all the same size. This is an important concept in teaching a fraction of a set. The items in the set need not be identical as they *must* be when writing a fraction about parts of a whole. For example, if we say that  $\frac{1}{4}$  of the singers are girls (as in question 1), there is no assumption that the singers are identical (or even the same size). In fact, the parts *must* be different in order to write a fraction statement about them.



## PRACTICE

What fraction of each is shaded?

- 
 $\frac{2}{5}$
- 
 $\frac{3}{4}$
- 
 $\frac{3}{10}$
- 
 $\frac{7}{10}$
- 
 $\frac{4}{10}$
- 
 $\frac{5}{10}$

Divide.

- $8 \overline{)24}^3$
- $9 \overline{)81}^9$
- $8 \overline{)40}^5$
- $9 \overline{)63}^7$



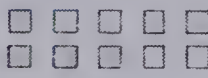
What fraction of each is shaded?

- 
 $\frac{1}{3}$
- 
 $\frac{3}{4}$
- 
 $\frac{6}{10}$

Which is greater?

- $\frac{3}{4}$  or  $\frac{1}{4}$
- $\frac{5}{10}$  or  $\frac{6}{10}$
- $\frac{2}{3}$  or  $\frac{1}{3}$

What fraction of each is shaded?

- 
 $\frac{1}{3}$
- 
 $\frac{3}{5}$
- 
 $\frac{8}{10}$

257

## Assigning the Practice

Minimum: 1-3

Average: 1-6

Enriched: 1-6

## Review Exercises

Questions	Objective	Pages
1-4	A54	250-251
5-7	N10	252-253
8-10	N11	254-255
11-13	N12	256-257

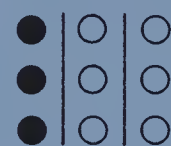
## Reinforcement

Give students sets of counters or other objects with varying attributes. Have them make sets and write fraction statements about the sets.

## Enrichment

Have students determine a unit fraction of a set.

For example: 9 dots


 $\frac{1}{3}$  of the dots are black.

So,  $\frac{1}{3}$  of 9 is 3.

Give other examples like:

20 students;  $\frac{1}{5}$  wear hats.

How many students wear hats?

The students may draw pictures to help solve the problem. Some may see that division will solve it.

$$20 \div 5 = 4$$

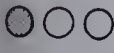








$$\text{So, } \frac{1}{5} \text{ of } 20 = 4$$

## Extra Practice

## Worksheet N12

Pages 256-257

What fraction is shaded?

- 
 $\frac{1}{3}$
- 
 $\frac{5}{6}$
- 
 $\frac{2}{5}$
- 
 $\frac{3}{4}$
- 
 $\frac{3}{10}$
- 
 $\frac{7}{10}$
- 
 $\frac{1}{10}$
- 
 $\frac{9}{10}$
- 
 $\frac{4}{10}$

## Problem Solving Activities

Assign Level 3, Unit 13.

Unit 13 Objective	Test Questions	Pages
A50	1-8	242-243
A51	9-10	244-245
A52	11-18	246-247
A53	19-22	248-249
A54	23-26	250-251
N10	27-30	252-253
N11	31	254-255
N12	32	256-257

# TEST

# UNIT 13

Divide.

1.  $18 \div 3$  6      2.  $3 \overline{)18}$  6      3.  $30 \div 5$  6      4.  $5 \overline{)30}$  6  
 5.  $25 \div 5$  5      6.  $5 \overline{)25}$  5      7.  $36 \div 4$  9      8.  $4 \overline{)36}$  9



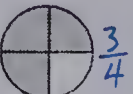

Solve.

9. 18 drummers  
2 rows  
How many in each row? 9  
 10. 15 buttons  
3 uniforms  
How many for each uniform? 5



Divide.

11.  $2 \overline{)9}$  4 R1      12.  $5 \overline{)38}$  7 R3      13.  $3 \overline{)29}$  9 R2      14.  $4 \overline{)22}$  5 R2  
 15.  $3 \overline{)17}$  5 R2      16.  $4 \overline{)30}$  7 R2      17.  $2 \overline{)15}$  7 R1      18.  $3 \overline{)25}$  8 R1  
 19.  $6 \overline{)42}$  7      20.  $6 \overline{)36}$  6      21.  $7 \overline{)56}$  8      22.  $7 \overline{)49}$  7  
 23.  $8 \overline{)48}$  6      24.  $9 \overline{)63}$  7      25.  $8 \overline{)32}$  4      26.  $9 \overline{)81}$  9

What fraction of the whole is shaded?

27.   $\frac{1}{2}$       28.   $\frac{2}{3}$       29.   $\frac{3}{4}$       30.   $\frac{8}{10}$

Write the larger fraction.

31.  or   $\frac{7}{10}$

What fraction is shaded?

32.   $\frac{4}{10}$

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## Post-test

Unit

Divide.

1.  $3 \overline{)15}$  5      2.  $4 \overline{)24}$  6      3.  $2 \overline{)14}$  7      4.  $5 \overline{)20}$  4  
 5.  $2 \overline{)8}$  4      6.  $3 \overline{)27}$  9      7.  $5 \overline{)35}$  7      8.  $4 \overline{)36}$  9

How many cards for each player?

9. 20 cards  
4 players 5  
 10. 45 cards  
5 players 9

Divide.

11.  $2 \overline{)9}$  4 R1      12.  $4 \overline{)13}$  3 R1      13.  $3 \overline{)19}$  6 R1      14.  $5 \overline{)17}$  3 R2  
 15.  $4 \overline{)26}$  6 R2      16.  $2 \overline{)19}$  9 R1      17.  $4 \overline{)23}$  5 R3      18.  $3 \overline{)22}$  7 R1



## MULTIPLICATION

Copy and complete.

1.  $3 \times \blacksquare = 21$   
7

2.  $\blacksquare \times 7$   
 $\times 3$   
21

3.  $\blacksquare \times 5 = 35$   
7

4.  $5$   
 $\times \blacksquare$   
35

Multiply.

5.  $7$   
 $\times 6$   
42

6.  $4$   
 $\times 6$   
24

7.  $8$   
 $\times 6$   
48

8.  $6$   
 $\times 6$   
36

9.  $7 \times 7$  49

10.  $7 \times 9$  63

11.  $7 \times 8$  56

12.  $7 \times 4$  28

13.  $6$   
 $\times 8$   
48

14.  $8$   
 $\times 8$   
64

15.  $7$   
 $\times 8$   
56

16.  $5$   
 $\times 8$   
40

17.  $9 \times 7$  63

18.  $9 \times 8$  72

19.  $9 \times 6$  54

20.  $9 \times 9$  81

Copy and complete each table.

21.

$\times$	5	8	3	9	1
6	$\blacksquare$	$\blacksquare$	$\blacksquare$	$\blacksquare$	$\blacksquare$
7	$\blacksquare$	$\blacksquare$	$\blacksquare$	$\blacksquare$	$\blacksquare$

Solve. 30 48 18 54 6  
35 56 21 63 7

22.

$\times$	7	4	8	6	2
9	$\blacksquare$	$\blacksquare$	$\blacksquare$	$\blacksquare$	$\blacksquare$
8	$\blacksquare$	$\blacksquare$	$\blacksquare$	$\blacksquare$	$\blacksquare$

63 36 72 54 18  
56 32 64 48 16

23. 8 rows

6 eggs in a row

How many eggs?

48

24. 9 weeks

How many days?

63

19.  $6 \overline{)36}$  6

20.  $6 \overline{)48}$  8

21.  $7 \overline{)28}$  4

22.  $7 \overline{)56}$  8

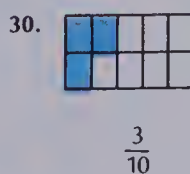
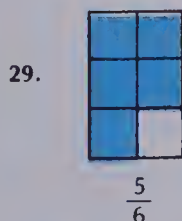
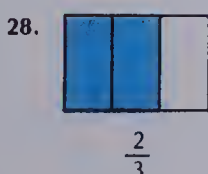
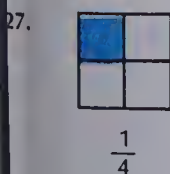
23.  $8 \overline{)40}$  5

24.  $8 \overline{)72}$  9

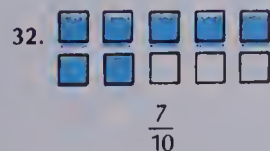
25.  $9 \overline{)36}$  4

26.  $9 \overline{)81}$  9

Colour the fraction part.



31. Colour the greater:  $\frac{3}{8}$  or  $\frac{5}{8}$ .



# UNIT 14

## Decimals

Theme: Cooking

Lesson		Objective	Vocabulary	Materials
Preview		Review fractions.	whole, tenths, fraction	decimal-plate poster, carrots, celery
1	N13	Interpret and write decimals to 0.9.	decimals, decimal point, tenths place	number blocks
2	N14	Interpret and write decimals to 9.9.	whole, ones, and tenths	number blocks
3	N15	Compare and order decimals to 9.9.	decimal numbers, $<$ , $>$ , count by tenths	number blocks, decimal number line
4	M17	Estimate and measure capacity using 1 L, 0.5 L, and 0.1 L containers.	capacity, container, holds, litre, L	1 L beaker with labels for 0.1 L, 0.2 L, ..., 20 different containers
5	A55	Add and subtract decimals to 1.8.	combine, model	2 L beakers with labels for 0.1 L, 0.2 L, ...
6	N16	Interpret and write decimals to 9.99.	hundredths, count by hundredths	number blocks, chart paper
7	M18	Use decimals to relate measurements involving centimetres and metres.	centimetre, metre, hundredth of a metre	metre stick, masking tape, felt markers
8	PS21	Use addition or subtraction with amounts to \$9.99.	dollar sign, \$, decimal point	dollars, dimes, pennies
	PS22	Relate amounts to \$9.99 with decimal numbers.	equation, trade, worth	large 10 by 10 grid on a \$1.00 bill
Test		Decimals		
Review		Division		



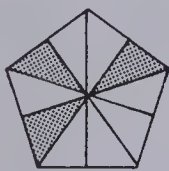
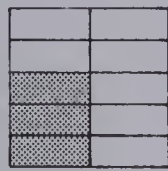
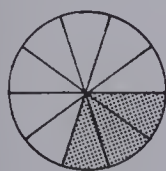
# About This Unit

Unit 14, Decimals, contains a gradual but significant introduction to the topic of decimal fractions. Since Unit 14 presents important concepts and relationships between fractions: place value, money, and linear measurement, it is essential that an instructional approach include active manipulation of concrete materials and that ample time be devoted to guided explorations and enrichment activities.

As the specific objectives of Unit 14 are developed, the following facets of decimals are investigated:

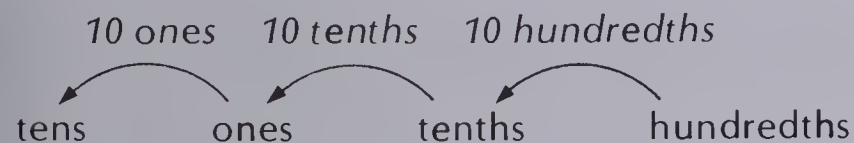
## 1. Decimals representing parts and wholes

A wide variety of regions and objects is useful for introducing decimals as a special kind of fraction. Frequent discussion of common fraction and decimal equivalents is recommended.



## 2. Decimals as place value entities

Decimals should also be experienced by students as an extension of the place value number system. The concept of place value numeration serves as a unifying thread throughout the *Houghton Mifflin Mathematics* program. Viewing decimals as a continuation of a familiar *pattern* is an enjoyable and fruitful approach. The relationship of tenths and hundredths is mentioned within this unit, but formal equivalences, such as  $0.3 = 0.30$ , are not stressed.



## 3. Decimals as numbers

Students become aware that decimals are numbers as a result of experiences with counting, comparing, adding, and subtracting. The similarity of these tasks with those for natural numbers is an opportunity for forging powerful generalizations that should not be overlooked.

8	0.8
+9	+0.9
<hr/>	<hr/>
17	1.7

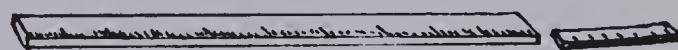
18, 19, 20, ...
0.18, 0.19, 0.20, ...

## 4. Decimals for expressing measurement amounts

Throughout Unit 14, number blocks are frequently utilized. At the beginning of each lesson the one (whole) should be clearly identified for the students. To encourage the place value interpretation of decimals, Unit 14 does not establish a single representation for the one. This will not cause confusion but rather enhance understanding, if thorough discussion and concrete manipulation is undertaken regularly.

one	tenth	hundredth

The measurement lessons on capacity, length, and money serve two functions: they develop useful and practical measurement skills and simultaneously reinforce the student's understanding of the decimal nature of the metric system. Each lesson requires an active approach using common measurement tools.



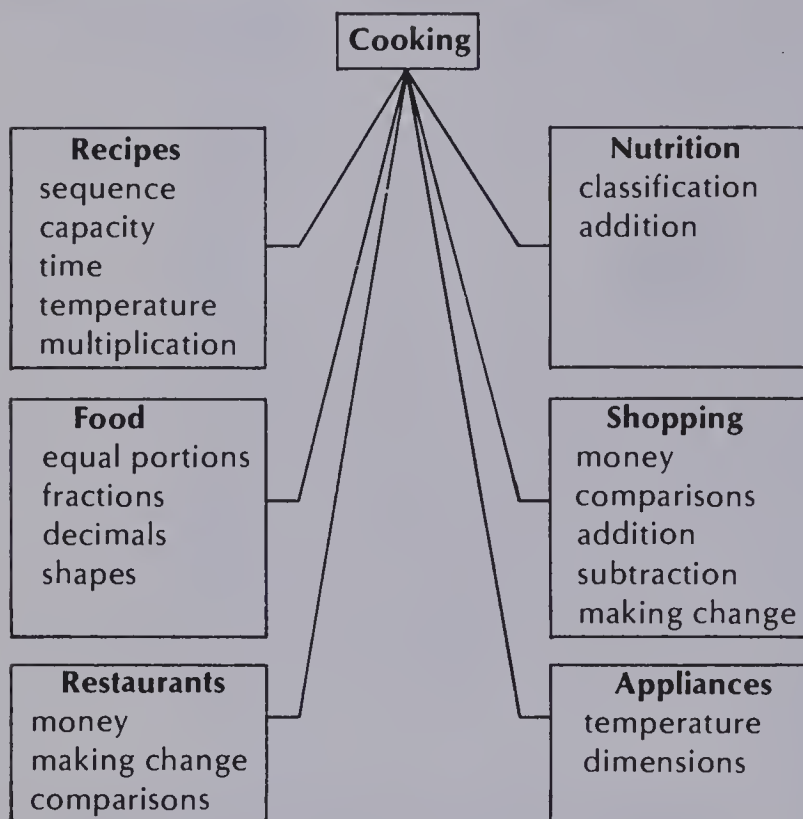
1 m and 32 cm = 1.32 m



0.5 L

# Ideas

The integrative theme of Unit 14 is *cooking*. As illustrated in the curriculum planning diagram below, a wide variety of mathematical concepts can be reviewed under the topic of cooking. Other educational and social benefits are many, assuming that suitable facilities, assistance, and planning are available.



The recipes in this section supplement those nutritious ones found as follow-up activities in the lessons. All significant measurements are given in metric amounts. (For baking, Fahrenheit temperatures are approximately double Celsius ones.)

Cooking with students requires organization. Below are several obvious suggestions. With your desire to be well prepared, don't overlook the special opportunities for incidental learning that cooking presents.

1. Write the recipe on chart paper.
2. Discuss the vocabulary and instructions.
3. Use clearly labelled containers for measuring.
4. Involve everyone in the preparation.

## Milky Way

1 L cold milk  
1 can frozen orange juice concentrate  
1 package instant vanilla pudding mix  
Beat everything together for about 2 minutes.

## Tomato Hot Broth

0.5 L beef broth (can)  
0.5 L tomato juice  
dash of salt, chili powder, and oregano  
Mix everything in a saucepan. Simmer for 5 minutes on a stove. Serve with corn chips.

## Tropical Delight

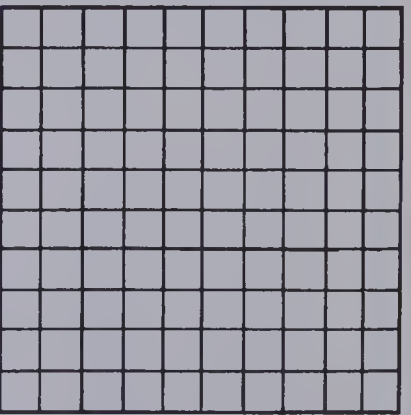
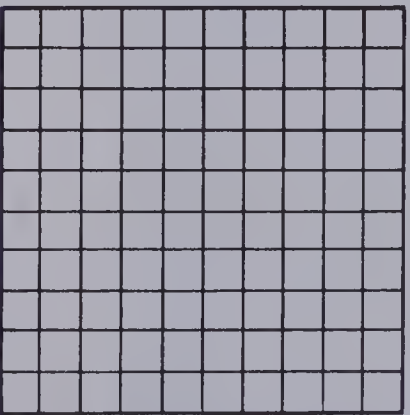
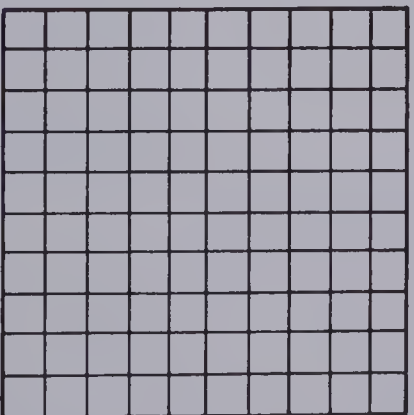
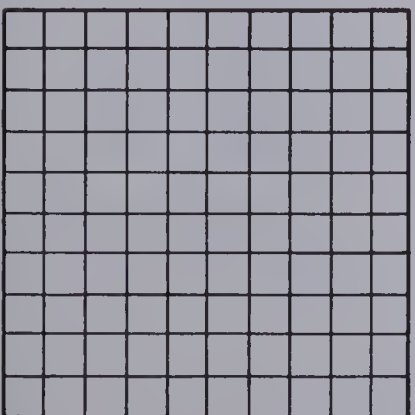
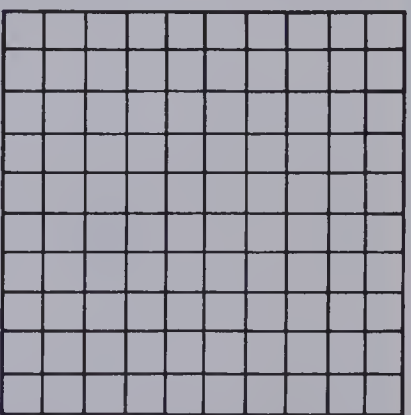
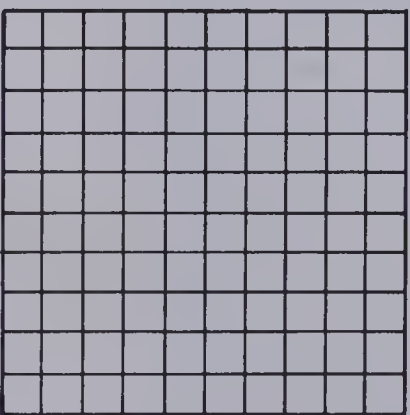
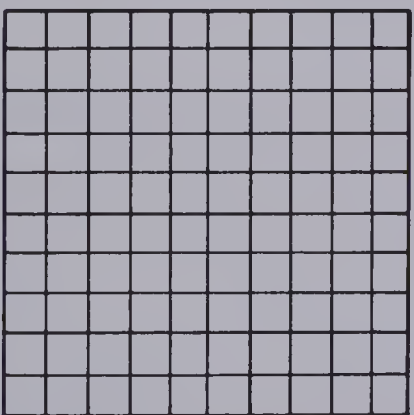
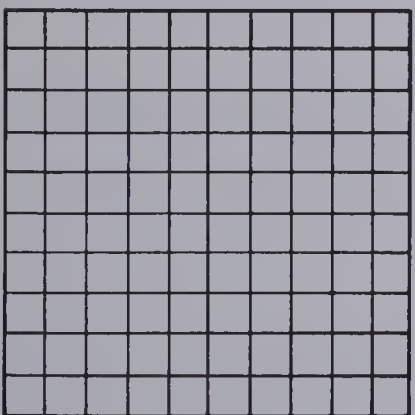
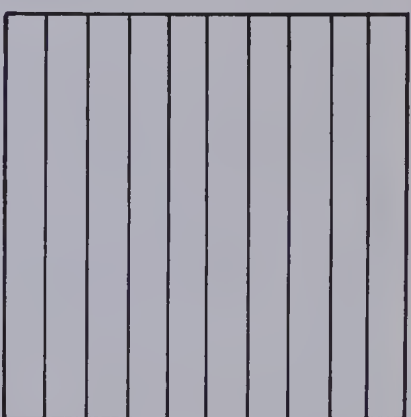
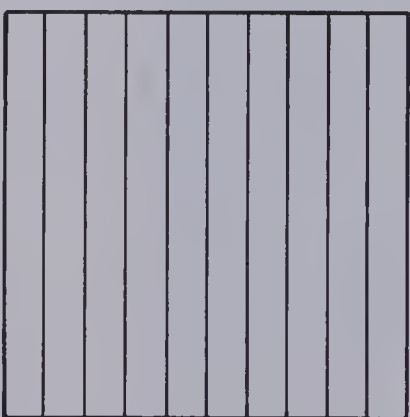
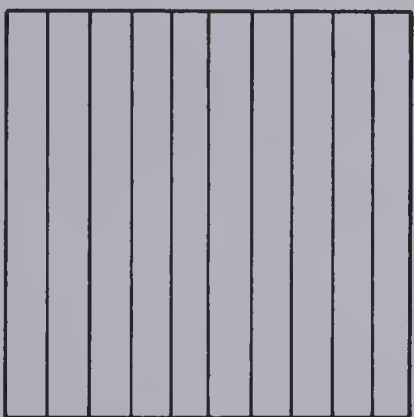
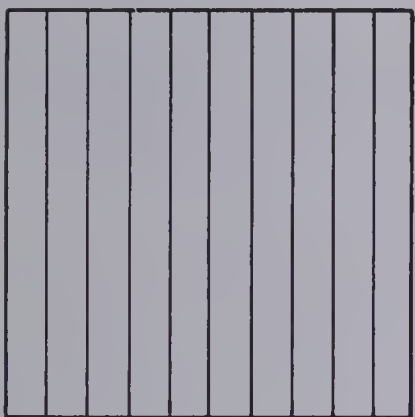
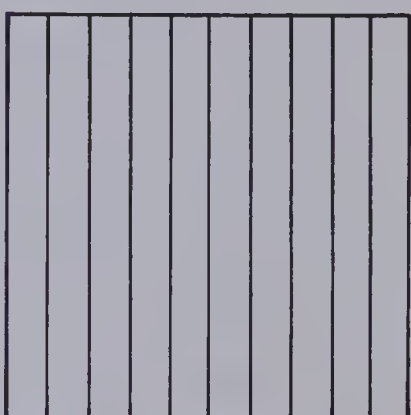
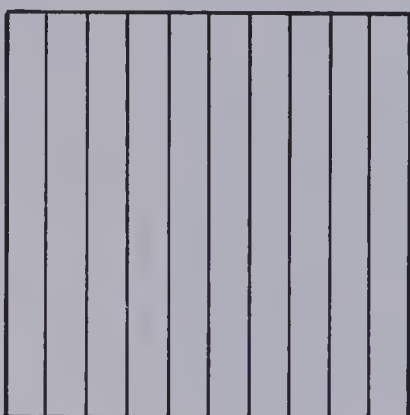
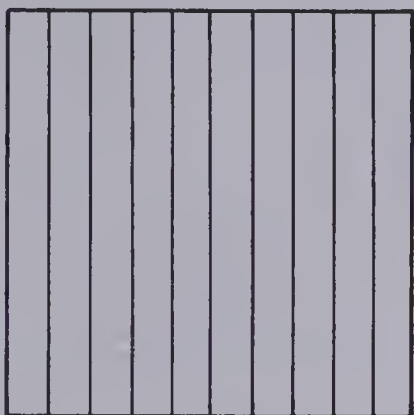
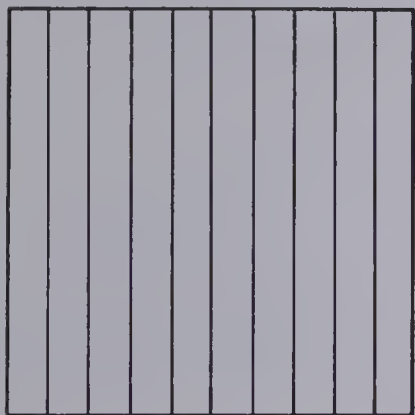
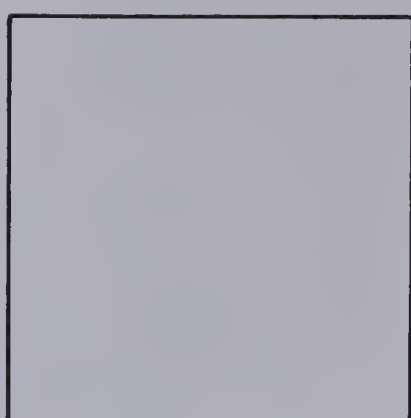
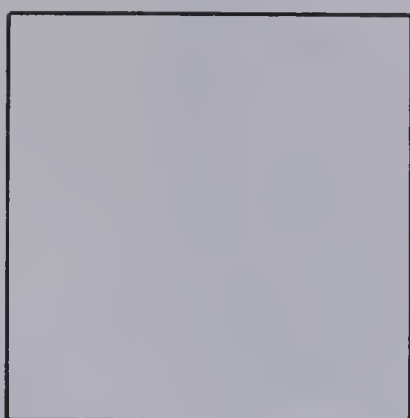
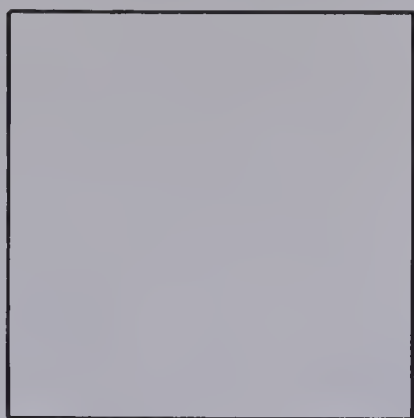
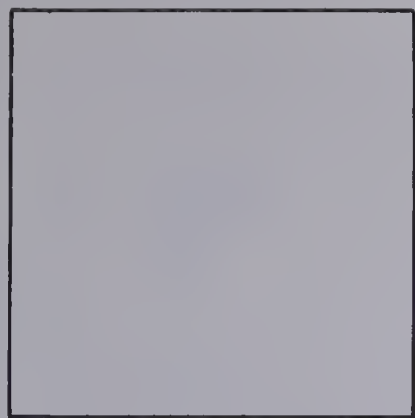
1 L drained fruit cocktail  
0.5 L flaked coconut  
0.1 L frozen orange juice concentrate

## Solid Gorp

0.3 L chocolate bits	0.3 L raisins
0.4 L honey	0.3 L shredded coconut
0.3 L chopped nuts	0.2 L wheat germ
0.2 L chopped dates	0.4 L quick oatmeal

Melt the chocolate and honey in a double boiler. Pour the melted mixture over the other ingredients. Mix well and spread in a flat pan. Refrigerate. Cut into squares before serving.





# UNIT 14

TECMA



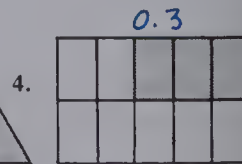
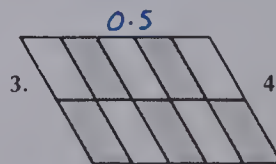
Unit 14 Objective	Test Questions	Pages
N13	1-4	262-263
N14	5-7	264-265
N15	8-9	266-267
M17	10-13	268-269
A55	14-17	270-271
N16	18-21	272-273
M18	22-24	274-275
PS21	25-28	

## Pretest

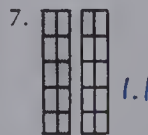
Write the decimal.

1.  $\frac{8}{10}$  0.8

2. four tenths 0.4



5. three and one tenth 3.1



8. Which is greater?  
1.7 or 7.1

9. Put these in order.  
0.9, 1.3, 2.1, 0.5  
0.5, 0.9, 1.3, 2.1

Does it hold closer to 1.0 L or 0.5 L?

10. 0.3 L  
0.5 L

11. 0.9 L  
1.0 L

12. 0.6 L  
0.5 L

13. 1.3 L  
1.0 L

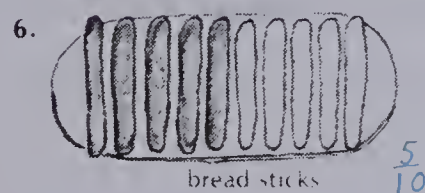
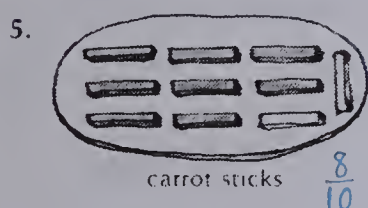
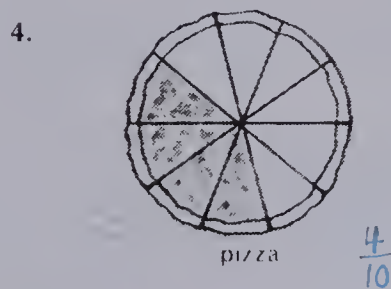
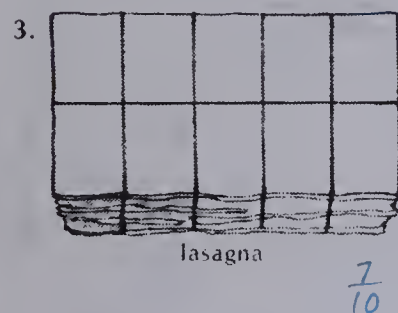
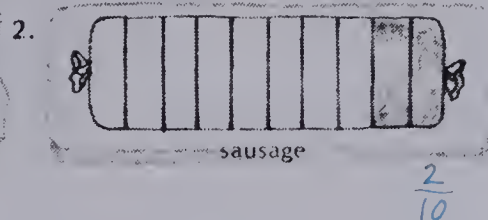
Unit 14



# Feasting on Fractions

Write the fraction that is shaded.  
Also write the fraction in words.

Example:   $\frac{3}{10}$  three tenths



Draw a food picture for each fraction.

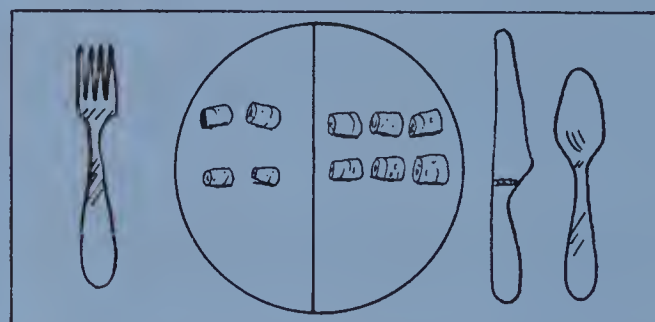
7.  $\frac{1}{10}$  one shaded of 10    8.  $\frac{9}{10}$  9 shaded of 10    9. four tenths 4 shaded of 10    10. ten tenths 10 shaded of 10

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## UNIT 14 PREVIEW

### Suggestions

You will need several long carrot sticks and celery sticks, a cutting board, a kitchen knife, and a *decimal-plate poster*. Cut the carrot stick into 10 equal pieces. Determine that the *whole* carrot stick has been cut into *tenths*. Each piece is one tenth of the whole stick.



Place 4 pieces of the carrot on the left side of the plate poster and 6 pieces on the right side. Relate these fractions to the appropriate subset of the 10 pieces.

$\frac{4}{10}$   $\frac{6}{10}$  4 tenths 6 tenths

Repeat this activity several times using different slices and various distributions of 10 tenths. After each discussion, distribute the 10 carrot or celery pieces to the students to eat.

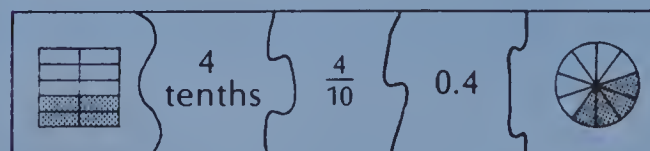
Note that each slice consists of ten tenths or  $\frac{10}{10}$  of carrot slices. Establish that 1 equals  $\frac{10}{10}$  or a whole equals 10 tenths.

### About the Page

Read the food words together. Discover that each food on pages 260 and 261 has been cut into tenths. Discuss the directions, focusing on the two ways of writing fractions:  $\frac{3}{10}$  and three tenths.

### Reinforcement

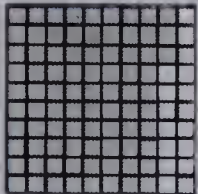
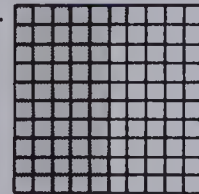
Provide a five-part puzzle for each of the fractions 1 tenth to 10 tenths. On the first day provide the three sections shown on the left. After the next lesson include all five sections.



ld or subtract.

0.3 + 0.7 = 1.0    15. 0.9 - 0.6 = 0.3    16. 0.8 + 0.8 = 1.6    17. 0.7 - 0.6 = 0.1

rite the decimal.

$\frac{43}{100}$  0.43    19.  0.83    20.  0.51    21. 5 and 9 hundredths 5.09

ange to metres. ■ ■ ■ m

82 cm 0.82 m    23. 326 cm 3.26 m    24. 4 m and 45 cm 4.45 m

ld or subtract.

\$8.55 + 4.29 = \$12.84    26. \$4.26 + 0.85 = \$5.11    27. \$6.75 - 1.38 = \$5.37    28. \$9.00 - 7.32 = \$1.68

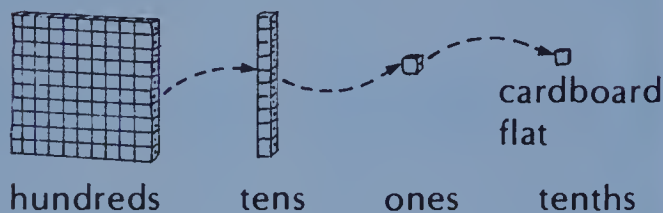
## Objective N13

Interpret and write decimals to 0.9.

### Introducing the Lesson

Review the importance of 10 using number blocks.

Break it into 10 equal pieces.



Discuss the numbers in the table below. Determine that a separation is needed between the ones digit and tenths digit. Get suggestions from the students as to how the division could be shown.

hundreds	tens	ones	tenths	
3	4	2		= 342
	7	4		= 74
		0	*	6 = 0*6 (not 6)
		0	*	2 = 0*2 (not 2)
		0	*	1 = 0*1 (not 1)

### Teaching the Lesson

Introduce the *decimal point* • as the conventional way of locating the ones place. Discuss these examples.

$\frac{3}{10}$	3 tenths	0.3
$\frac{5}{10}$	5 tenths	0.5
$\frac{1}{10}$	1 tenth	0.1
$\frac{9}{10}$	9 tenths	0.9

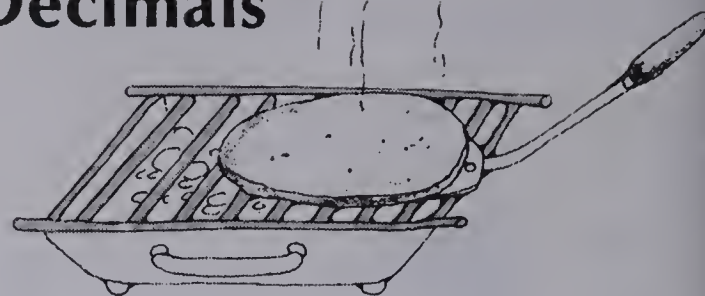
Read and discuss the presentation on page 262. Note that the hamburger covers only 0.6 of the grill pieces since 3 metal bars on the left and 1 on the right are not touched. Use the following diagram to restate the role of 10.

To move left, put together 10 pieces.

thousand      hundred      ten      one      tenth

## Tenths as Decimals

The hamburger covers  $\frac{6}{10}$  of the grill pieces.

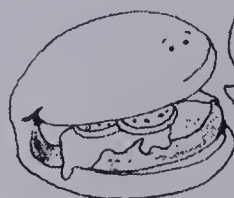


$\frac{6}{10}$  can also be written 0.6

no ones      6 tenths

decimal point

It takes 10 tenths to make 1 one.



It takes 10 ones to make 1 ten,  
10 tens to make 1 hundred, and  
10 hundreds to make 1 thousand.

### EXERCISES

Write as a decimal.

- $\frac{1}{10}$  0.1
- $\frac{3}{10}$  0.3
- $\frac{5}{10}$  0.5
- $\frac{7}{10}$  0.7
- $\frac{9}{10}$  0.9
- $\frac{0}{10}$  0.0
- two tenths 0.2
- four tenths 0.4
- eight tenths 0.8
- 0.2
- 0.8
- 0.5

### Using the Exercises

- Questions 1 to 6 involve translating from fraction notation to decimals.
- Writing decimals from language and concrete representations is the intent of questions 7 to 12.

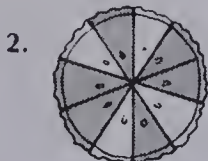


## PRACTICE

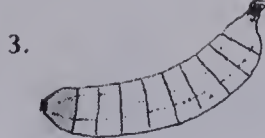
Write a decimal for the shaded part.



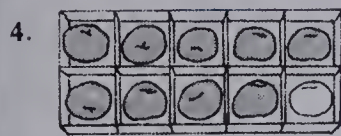
fruit salad  
0.4



apple pie  
0.6



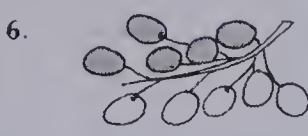
banana  
0.1



plums  
0.9



pineapple  
0.3

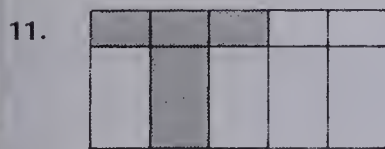


grapes  
0.5

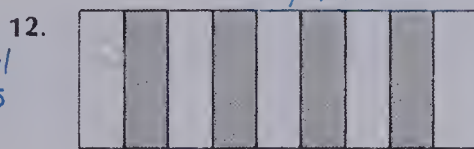
Draw a fruit picture for each decimal.

7. 0.3      8. 0.1      9. two tenths      10. four tenths

The pictures do **not** show 0.4. Explain why.



not equal  
sections



only 9 sections

## Break Fast

Let be 1.0.

1.0 can be broken into 0.3 and 0.7

1. Break 1.0 into **two** pieces in 5 different ways.
2. Break 1.0 into **three** pieces in 10 different ways.

ie.  $(0.1 + 0.2 + 0.7 = 1.0)$

answers may vary.



$$\begin{aligned} 0.1 + 0.9 &= 1.0 \\ 0.2 + 0.8 &= 1.0 \\ 0.3 + 0.7 &= 1.0 \\ 0.4 + 0.6 &= 1.0 \\ 0.5 + 0.5 &= 1.0 \end{aligned}$$

263

## Assigning the Practice

Minimum: 1-10

Average: 1-12

Enriched: 1-12

## Reinforcement

Organize a "Decimal-snack Party". Provide each student with a kind of food and, if necessary, a knife. Have the students cut or separate the foods into tenths. (Challenge them to plan carefully before they cut.) Allow each student to eat a variety of foods amounting to 10 tenths of a whole. Foods for this activity may include celery, carrots, apples, bananas, grapes, dates, pears, raisins, peanuts, chocolate drops, etc.

## Enrichment

1. Students should experience the usefulness of models for solving problems. Provide Unifix or Multilink blocks for *Break Fast* at the bottom of page 263. Let the students develop their own strategies and their own ways of recording answers.

### 2. Cheese'n Celery

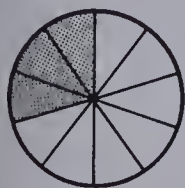
- 10 celery stalks
  - 1 large package of softened cream cheese
  - several pinches of parsley and grated onion
  - a dash of paprika
- Mix together the cream cheese, parsley, and onion. Spread the mixture on the celery sticks. Sprinkle on the paprika. Cut each stalk into tenths.

## Extra Practice

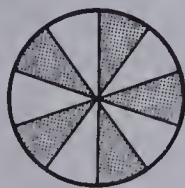
## Worksheet N13

Pages 262-263

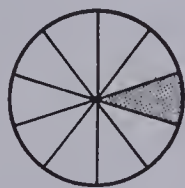
Colour the decimals and fractions as shown.



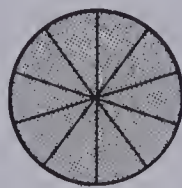
blue



green



red



orange

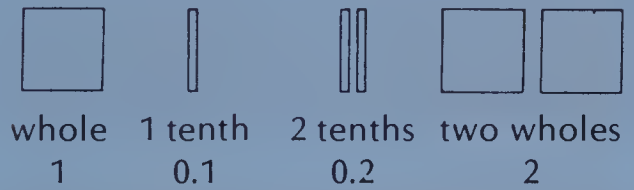
$\frac{1}{10}$ red	$\frac{10}{10}$ orange	$\frac{3}{10}$ blue	$\frac{5}{10}$ green
3 tenths blue	5 tenths green	10 tenths orange	1 tenth red
0.3 blue	1.0 orange	0.5 green	0.1 red

Objective N14

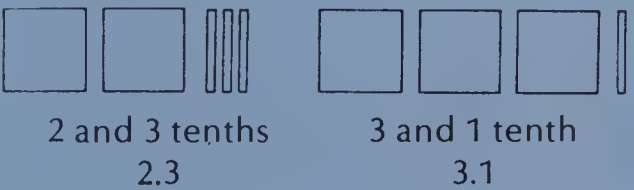
Interpret and write decimals to 9.9.

Introducing the Lesson

Review the concepts of *whole* (one) and *part* using common objects. Say, "Let's think of this *flat* (number block) as being a whole (a one). What will this *rod* be then? Yes, it would be *one tenth*, since it takes ten tenths to make 1 whole (10 rods to make 1 flat)."



Introduce decimals to 9.9 using number blocks.



For at least ten decimals, provide one representation and have the students supply the other two.

Teaching the Lesson

Recall that 10 tenths = 1 one. Record a variety of examples on a chart, as below, carefully modelling each step with the number blocks. Practise reading the decimals.

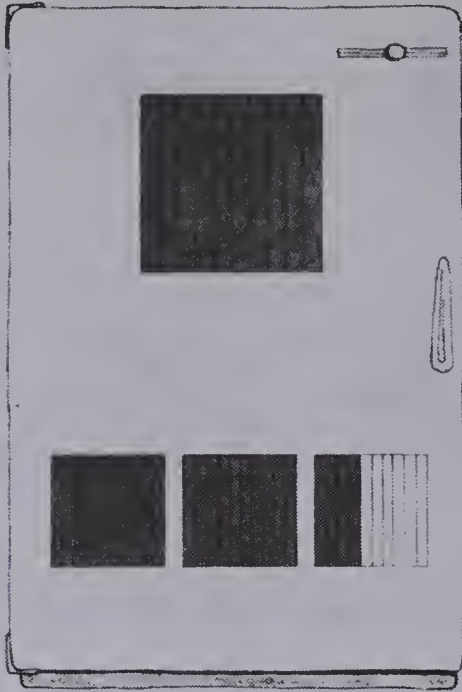
tenths	ones	tenths	decimal
9	0	9	0.9
12	1	2	1.2
10	1	0	1.0
30	3	0	3.0
24	2	4	2.4

say:

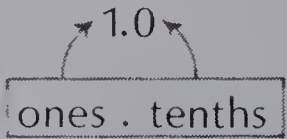
- "nine tenths"
- "one and two tenths"
- "one"
- "three"
- "two and four tenths"

Review the concepts using the discussion on page 264.

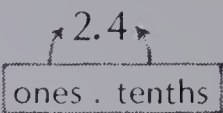
Decimals Greater Than 1.0



10 tenths = 1 one 0 tenths



24 tenths = 2 ones 4 tenths



You read 2.4 as *two and four tenths*.

EXERCISES

Write as a decimal

- 1. 15 tenths 1.5
- 2. 26 tenths 2.6
- 3. 12 tenths 1.2
- 4. 20 tenths 2.0
- 5. 9 tenths 0.9
- 6. 30 tenths 3.0

How many tenths? Write as a decimal.

- 7. 1.5
- 8. 2.0
- 9. 2.9

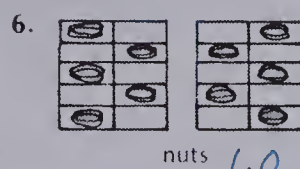
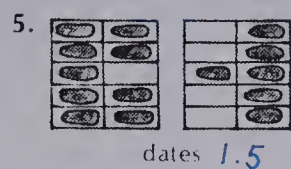
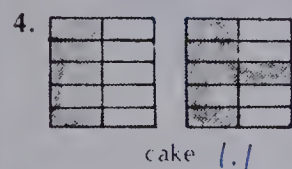
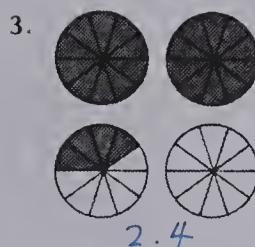
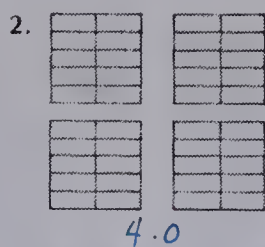
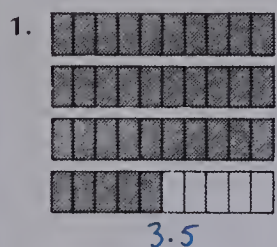
Using the Exercises

- Students may need to use flats and rods to reason out questions 1 to 6.
- Before assigning practice problems to a student, questions 7 to 9, involving pictorial models, should be understood. Further manipulative and pictorial examples may be required for some students.



## PRACTICE

Write as a decimal.



Write how you read the decimal.

7. 6.4      8. 3.2      9. 5.9      10. 8.0      11. 0.8  
6 and 4 tenths    3 and 2 tenths    5 and 9 tenths    8 and 0 tenths    8 tenths

Draw a picture for each decimal.

12. 2.4      13. 1.3      14. 2.0      15. 0.2      16. 3.5

## Ingredients for Counting

Count by tenths from 1.8 to 6.8.

Remember to trade 10 tenths for a whole.



ones . tenths

1.8
1.9
2.0
2.1
2.2

265

## Assigning the Practice

Minimum: 1-3, 7-16

Average: 1-3, 7-16

Enriched: 1-16

## Reinforcement

1. *Ingredients for Counting* at the bottom of page 265 deals with counting by tenths. The process used is almost identical to that used in Unit 3 for counting with whole numbers. Provide the students with a counting column as shown on page 265 and manipulative materials for ones and tenths (e.g., flats and rods or rods and cubes). At each step, the student adds one more tenth. Ten tenths are traded for a whole (one).

2. Convert dot-to-dot puzzles to a decimal format. For instance, change 3 to 0.3, 17 to 1.7, 20 to 2.0, etc. Assign some students to help make conversions. Using materials, you may demonstrate that inserting the decimal point results in one tenth of the original value, e.g., "It takes ten 0.3s to make 3."

## Enrichment

Challenge students to draw line segments that cut each figure below into tenths.



## Extra Practice

## Worksheet N14

Pages 264-265



Write as a decimal.

1. 23 tenths = 2 ones 3 tenths = 2.3  
 2. 20 tenths = 2 ones 0 tenths = 2.0  
 3. 4 tenths = 0 ones 4 tenths = 0.4  
 4. 52 tenths = 5 2      8. 40 tenths = 4 0  
 5. 30 tenths = 3 0      9. 99 tenths = 9 9  
 6. 8 tenths = 0 8      10. 10 tenths = 1 0  
 7. 45 tenths = 4 5      11. 100 tenths = 1 0 0

## Objective N15

Compare and order decimals to 9.9.

### Introducing the Lesson

Say, "Today we will let the rod  be the whole (equal to 1). What will be 0.1? That's right, the cube . Since it takes 10 cubes to make a rod, a cube stands for 0.1."

Count from 0.0 to 3.0 using cubes and rods. Record the decimal numbers on a large number line. Stress the trading steps, for example, 1 one and 10 tenths becomes 2 ones and no tenths. Recall the identical trading step encountered when counting with whole numbers.

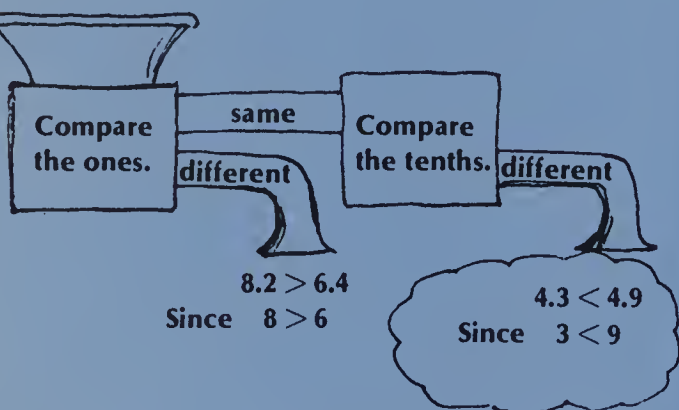


### Teaching the Lesson

Using the number line, compare various decimal numbers. Have the students recall that  $>$  is read as *is greater than* and  $<$  as *is less than*.

$$\begin{array}{lll} 0.3 \bigcirc 1.3 & 2.4 \bigcirc 1.4 & 1.3 \bigcirc 1.5 \\ 2.3 \bigcirc 2.5 & 2.1 \bigcirc 1.2 & 0.8 \bigcirc 1.2 \end{array}$$

Ask the students if they can describe a way to compare decimal numbers to 9.9 without using the number line. If no one has a suitable suggestion, refer back to the illustration on page 48. A related comparison machine would appear thus:



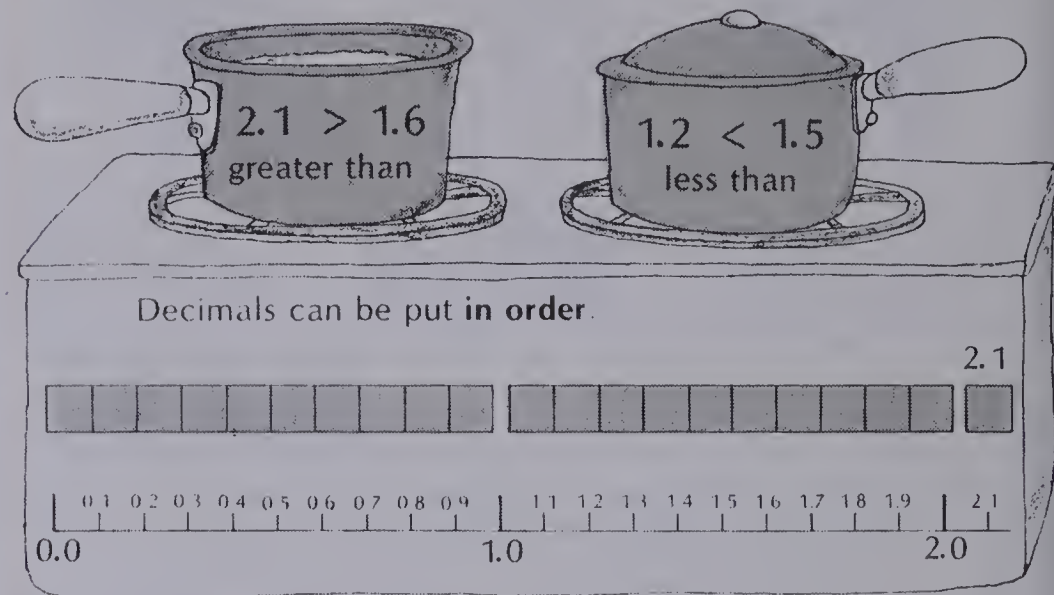
Read together the discussion on page 266. Stress that decimal numbers can be put *in order* in the same way as whole numbers.

## Comparing Decimals

Decimals are **compared** like other numbers.

Compare the ones.

Compare the tenths only if the ones are equal.



### EXERCISES

Which is greater?

1. 2.1 or 1.8
2. 4.0 or 3.5
3. 2.5 or 4.0
4. 3.2 or 3.6
5. 4.0 or 4.2
6. 6.4 or 6.1

Which is less?

7. 1.2 or 1.7
8. 2.3 or 1.2
9. 0.9 or 5.0

Put each set in order.

10. 0.6, 1.5, 2.4, 3.2
11. 1.4, 1.6, 2.5, 2.7

### Using the Exercises

- Questions 1 to 9 require the comparison of decimal numbers to 9.9. The first three exercises are the comparison of decimal numbers with different ones, the second three compare decimal numbers with different tenths, and the last three are mixed. If difficulties arise, allow the use of a decimal number line to 9.9 or rods and cubes.
- Questions 10 and 11 deal with the ordering of decimal numbers. Although ascending order is preferred, answers in descending order also are correct.



## PRACTICE

Which is greater?

1. 3.5 or 5.3
2. 2.4 or 2.1
3. 1.5 or 0.5
4. 1.5 or 1.7
5. 5.6 or 4.0
6. 3.2 or 3.6

Compare the decimals using  $>$  and  $<$ .

7. 2.4  $>$  2.3
8. 1.3  $<$  3.0
9. 0.5  $>$  0.2
10. 5.3  $>$  3.3
11. 1.8  $>$  1.0
12. 9.3  $<$  10.0

Put each set in order.


13. 1.1, 1.3, 1.5
14. 2.0, 2.3, 2.7
15. 0.3, 0.6, 0.9
16. 2.1, 2.3, 3.2
17. 3.5, 5.0, 5.0
18. 1.6, 1.6, 1.8

Count by tenths.

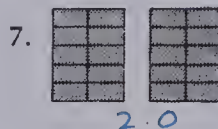
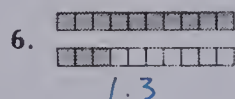
19. 0.0 to 1.5
20. 3.5 to 4.5
21. 8.5 to 10.0

## REVIEW

Write the decimal.

1.  $\frac{3}{10}$  0.3
2.  $\frac{9}{10}$  0.9
3. two tenths 0.2
4.  0.1

5. four and one tenth 4.1



Which is less?

8. 6.2 or 2.6
9. 3.1 or 3.6

Put in order.

10. 2.0, 1.4, 0.7

267

## Assigning the Practice

Minimum: 1-20

Average: 1-21

Enriched: 1-21

## Review Exercises

Questions	Objective	Pages
1-4	N13	262-263
5-7	N14	264-265
8-10	N15	266-267

## Reinforcement

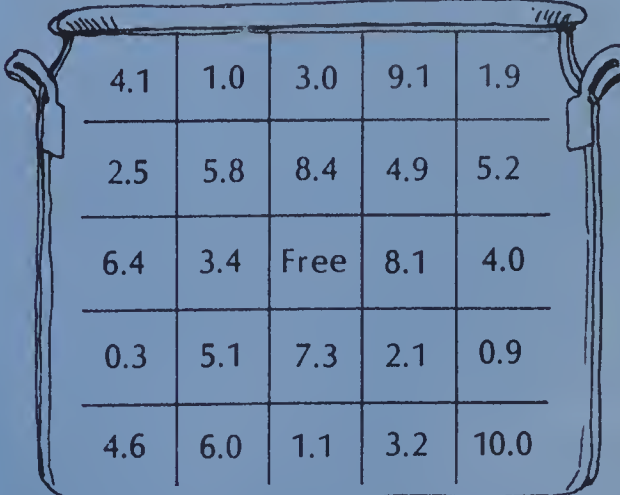
1. Play "Decimal-Fraction Flip". Tape the words "fraction" and "decimal" to opposite sides of a coin. Call out a number involving tenths, e.g., "three and two tenths". Each student may write either the decimal (3.2) or the fraction ( $3\frac{2}{10}$  or  $\frac{32}{10}$ ). Next, toss the

labelled coin. Anyone who wrote correctly the number form that lands heads up may add another tenth onto their score. The winner is the first player to 1.0.

2. Convert a used 100 chart pegboard to a 10.0 chart by inserting decimal points. Most of the 100 chart games and activities can be easily altered for the 10.0 chart.

## Enrichment

Construct a collection of "Decimal Bingo" pots using these 24 numbers: 0.2, 0.8, 0.9, 1.0, 1.8, 2.0, 2.4, 2.9, 3.1, 3.3, 3.9, 4.0, 4.5, 4.8, 5.0, 5.1, 5.7, 5.9, 6.3, 7.2, 8.0, 8.3, 9.0, 9.9. Before each game decide which version of Decimal Bingo to play: *one more tenth* or *one less tenth*. As the teacher calls a number (3.2), each student plays a chip on the correct number (3.1 or 3.3). The winner is chosen as in regular Bingo.



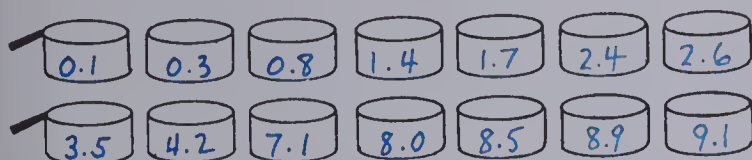
4.1	1.0	3.0	9.1	1.9
2.5	5.8	8.4	4.9	5.2
6.4	3.4	Free	8.1	4.0
0.3	5.1	7.3	2.1	0.9
4.6	6.0	1.1	3.2	10.0

## Extra Practice

### Worksheet N15

Pages 266-267

Write the decimal numbers in order in the pots.



7.1	0.8	1.4	8.0	2.6	7.7	0.3
0.7	3.5	8.5	2.4	8.9	4.2	9.1

## Objective M17

Estimate and measure capacity using 1 L, 0.5 L, and 0.1 L containers.

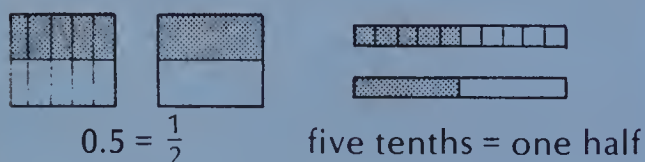
## Introducing the Lesson

Display a 1 L beaker. Ask if anyone knows of a common container that holds the same amount of liquid. Show that a 1 L milk carton holds about the same amount of liquid by pouring water back and forth between the two containers. Introduce **litre** as a unit for **capacity**.

Display a 0.1 L beaker or container. Ask, "How many litres does this hold?" Show that 10 portions are required to fill a 1 L container. Conclude that the small container holds one tenth of a litre (0.1 L).

Display a 0.5 litre milk carton. Ask, "How many litres does this hold?" Use the 0.1 L container to show that the carton holds five 0.1 L or 0.5 L (by counting).

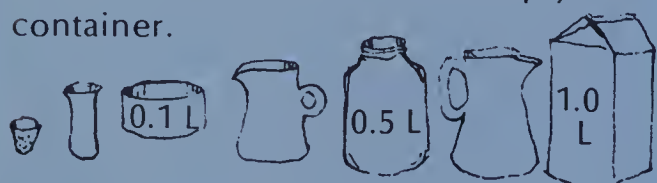
Discover that two 0.5 L will fill a 1.0 L container. This means 0.5 L is equal to  $\frac{1}{2}$  of a litre. Help the students to generalize this result using the following diagrams.



## Teaching the Lesson

Display approximately 20 containers. Have the students estimate the capacity of each container and place it in order relative to 0.1 L, 0.5 L, and 1.0 L containers.

Have water available to allow comparisons of capacity by pouring water from a filled container to an empty container.



Discuss each container using phrases similar to these:

"The olive jar holds less than 0.5 L but more than 0.1 L."

# Litres

The **litre** is a measurement unit for liquid **capacity**. Milk cartons come in a one-litre size.

One litre is written as **1 L**.

0.5 L is another popular size.

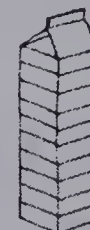
0.1 L is a small amount of liquid.



Did you know?

$$0.5 = \frac{1}{2}$$

five tenths = one half



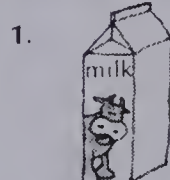
0.5



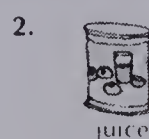
$\frac{1}{2}$

## EXERCISES

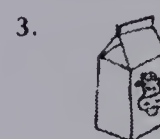
Does it hold closer to 0.5 L or 1.0 L?



1.0 L



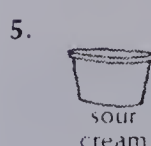
0.5 L



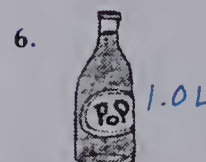
0.5 L



1.0 L



0.5 L



1.0 L



0.5 L



1.0 L

Complete each equation.

9. five tenths = one  half

10.  $\frac{1}{2} = \text{■} \cdot \text{■} \cdot 0.5$

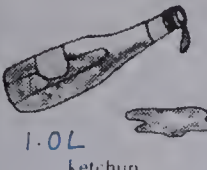



## Using the Exercises

- For questions 1 to 8, the teacher may provide actual containers for the students to observe and manipulate.
- Questions 9 and 10 review the equivalence of  $\frac{1}{2}$  and 0.5. It is desirable if examples of the containers on pages 268 and 269 are actually on display for students to see and touch.



## PRACTICE

Does the container hold closer to 0.5 L or 1.0 L?

-  1.0L ketchup
-  0.5L soup
-  0.5L vase
-  1.0L tea pot

Suppose this container holds 0.1 L.



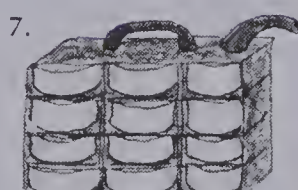
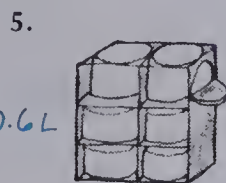
Match each container with an estimated capacity.

Estimates:

0.3 L

0.6 L

1.2 L



8. How many half litres does it take to make one litre? 1.2L

2

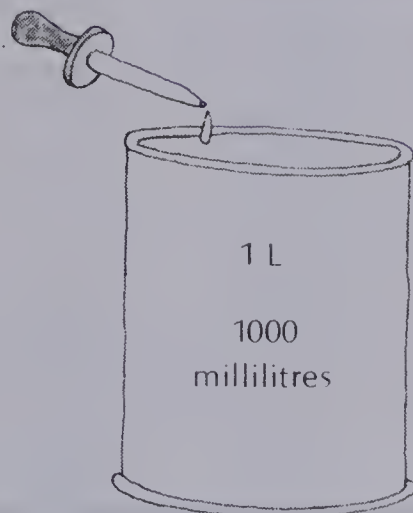
## Many Millilitres Later

There are 1000 millilitres in a litre.

- There are 2000 mL in 2 L.
- There are 8000 mL in 8 L.
- There are 6000 mL in 6 L.

There are 200 mL in 0.2 litres.

- There are 500 mL in 0.5 L.
- There are 100 mL in 0.1 L.
- There are 1000 mL in 1.0 L.



269

## Assigning the Practice

Minimum: 1-4

Average: 1-8

Enriched: 1-8

## Reinforcement

Provide a variety of containers for estimation and measurement of capacity. Several items function as "tidy" replacements for water: popcorn, peanuts, puffed cereal, packing chips,...

## Enrichment

1. Use a litre container that is graduated in millilitres (mL) to help with the discussion of *Many Millilitres Later* at the bottom of page 269. The recipes may be converted to mL if desired.

2. See the comments on kitchen math found in the Ideas section of the introduction to this unit before tackling this feast.

### Sun Smacked Sandwiches

0.5 L peanut butter

0.2 L undiluted frozen orange juice concentrate

32 slices whole wheat bread

Mix the peanut butter and orange juice concentrate with a fork. Use the mixture to make tasty sandwiches.

### Tasty Fruity Cup

0.5 L sliced bananas

0.4 L sliced strawberries

0.3 L halved blueberries

0.4 L chilled pineapple juice

a bit of sugar

Mix the fruits together and spoon into cups. Pour the juice over the fruit and serve at once.

### Apricot Milkshake

1.0 L milk

0.5 L cold apricot juice

Stir or shake the milk and juice together.

### Quick Gorp

0.4 L salted peanuts

0.3 L raisins

0.2 L chocolate pieces

## Extra Practice

Use several different containers.

Estimate how much each container holds in tenths of a litre

Check your estimates with a litre-measuring container.

Answers will vary.

## Worksheet M17

Pages 268-269

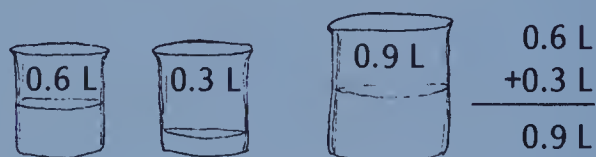
Container	Estimate	Measure

## Objective A55

Add and subtract decimals to 1.8.

### Introducing the Lesson

Display three containers that are clearly labelled for capacity measurement with 0.1 L increments: two containers from 0.1 L to 1.0 L and the third 0.1 L to 2.0 L. Fill the first container with 0.6 L of water and the second container with 0.3 L. Challenge the students to determine the combined capacity. Pour the water into the third container to check their estimates. Record the process as an addition calculation to summarize the process.



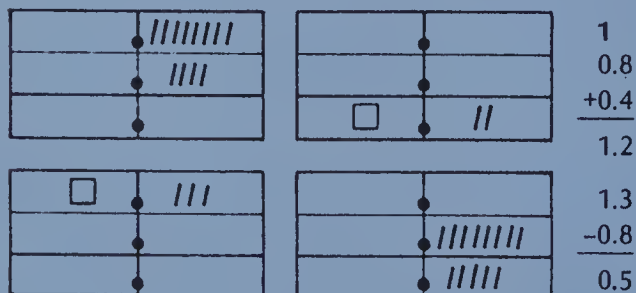
Using a similar procedure to that above, perform the capacity demonstration that will result in the following recordings:

0.8 L	0.9 L	0.9 L	1.4 L	1.3 L
+0.4 L	+0.5 L	-0.4 L	-0.9 L	-0.8 L
1.2 L	1.4 L	0.5 L	0.5 L	0.5 L

### Teaching the Lesson

Establish the flat (number block) as the whole (or one) for today's work. Review that the rods represent tenths as a result of this choice.

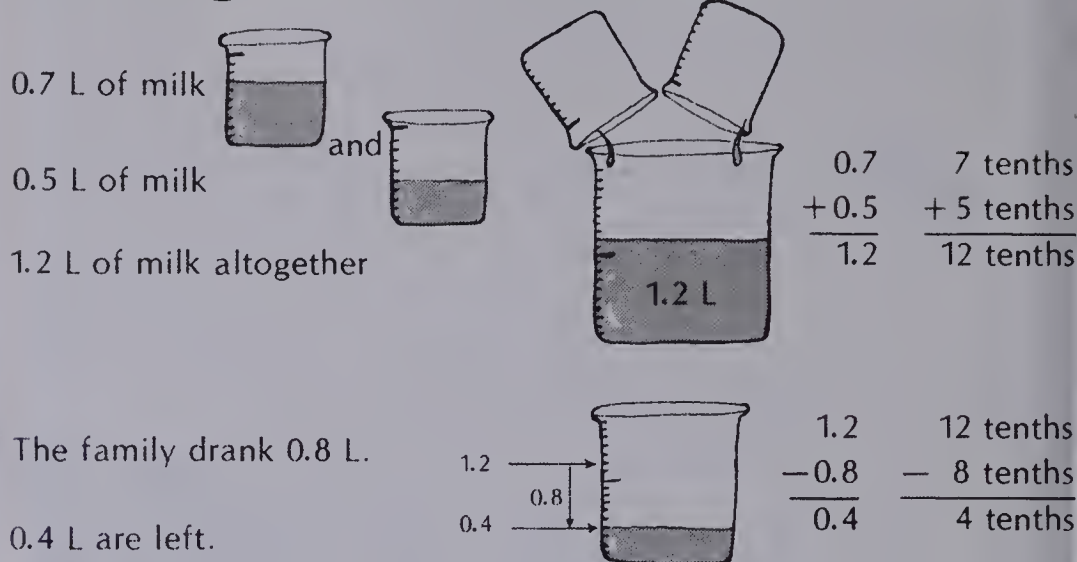
Use the number blocks to model the previous six addition and subtraction problems. The process is almost identical to that used throughout Units 4, 5, 9, and 10.



Finally, discuss the six problems with the tenths as units technique. Review the work done in Lesson 1.

0.7	7 tenths	1.2	12 tenths
+0.5	+5 tenths	-0.8	- 8 tenths
1.2	12 tenths	0.4	4 tenths

## Adding and Subtracting



### EXERCISES

Add.

- |   |   |   |   |
|---|---|---|---|
| 1. $\begin{array}{r} 3 \text{ tenths} \\ +4 \text{ tenths} \\ \hline 7 \text{ tenths} \end{array}$  | 2. $\begin{array}{r} 0.3 \\ +0.5 \\ \hline 0.8 \end{array}$ | 3. $\begin{array}{r} 0.3 \\ +0.6 \\ \hline 0.9 \end{array}$ | 4. $\begin{array}{r} 0.3 \\ +0.7 \\ \hline 1.0 \end{array}$ |
| 5. $\begin{array}{r} 3 \text{ tenths} \\ +8 \text{ tenths} \\ \hline 11 \text{ tenths} \end{array}$ | 6. $\begin{array}{r} 0.3 \\ +0.9 \\ \hline 1.2 \end{array}$ | 7. $\begin{array}{r} 0.4 \\ +0.9 \\ \hline 1.3 \end{array}$ | 8. $\begin{array}{r} 0.5 \\ +0.9 \\ \hline 1.4 \end{array}$ |

Subtract.

- |  |  |  |  |
|--|--|--|--|
| 9. $\begin{array}{r} 9 \text{ tenths} \\ -3 \text{ tenths} \\ \hline 6 \text{ tenths} \end{array}$   | 10. $\begin{array}{r} 1.0 \\ -0.3 \\ \hline 0.7 \end{array}$ | 11. $\begin{array}{r} 1.1 \\ -0.3 \\ \hline 0.8 \end{array}$ | 12. $\begin{array}{r} 1.2 \\ -0.3 \\ \hline 0.9 \end{array}$ |
| 13. $\begin{array}{r} 12 \text{ tenths} \\ -4 \text{ tenths} \\ \hline 8 \text{ tenths} \end{array}$ | 14. $\begin{array}{r} 1.2 \\ -0.5 \\ \hline 0.7 \end{array}$ | 15. $\begin{array}{r} 1.2 \\ -0.6 \\ \hline 0.6 \end{array}$ | 16. $\begin{array}{r} 1.2 \\ -0.7 \\ \hline 0.5 \end{array}$ |

### Using the Exercises

- Questions 1 to 3 and 9 require no regrouping. The other questions involve regrouping (implicit only since no computation exceeds the basic facts upper limit of  $9 + 9 = 18$ ). Provide number blocks and labelled litre containers for the students to verify their work.



## PRACTICE

Add or subtract.

- |                                    |                                    |                                    |                                    |                                    |
|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| 1. $0.7$<br>$+0.7$<br><hr/> $1.4$  | 2. $0.9$<br>$-0.4$<br><hr/> $0.5$  | 3. $1.3$<br>$-0.6$<br><hr/> $0.7$  | 4. $0.9$<br>$+0.6$<br><hr/> $1.5$  | 5. $0.3$<br>$+0.6$<br><hr/> $0.9$  |
| 6. $0.7$<br>$-0.6$<br><hr/> $0.1$  | 7. $1.2$<br>$-0.8$<br><hr/> $0.4$  | 8. $0.8$<br>$+0.2$<br><hr/> $0.6$  | 9. $0.6$<br>$+0.5$<br><hr/> $1.1$  | 10. $1.7$<br>$-0.8$<br><hr/> $0.9$ |
| 11. $0.3$<br>$+0.4$<br><hr/> $0.7$ | 12. $0.3$<br>$+0.8$<br><hr/> $1.1$ | 13. $1.4$<br>$-0.7$<br><hr/> $0.7$ | 14. $0.9$<br>$+0.9$<br><hr/> $1.8$ | 15. $1.5$<br>$-0.9$<br><hr/> $0.6$ |

Draw a picture. Then solve.

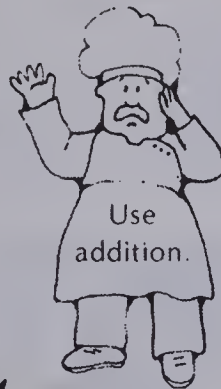
- |   |   |
|---|---|
| 16. 0.5 L of milk<br>0.5 L of orange juice<br>How much liquid? $1.0L$ | 17. 1.5 L of milk<br>0.5 L spilt<br>How much was left? $1.0L$ |
|---|---|

## Un•ex•pect•ed Com•pan•y

What can you feed them?  
Just double each recipe.

**Don's Duck**  
0.5 BBQ duck  
15 water chestnuts  
0.8 package plum sauce  
  
1.0 BBQ duck  
30 water chestnuts  
1.6 package plum sauce

**Marg's Muck**  
4.5 melted chocolates  
28 sticky gumdrops  
1.7 jars of nuts  
  
9.0 melted chocolates  
56 sticky gumdrops  
3.4 jars of nuts



271

## Assigning the Practice

Minimum: 1-15

Average: 1-17

Enriched: 1-17

## Reinforcement

1. As an activity provide each student with a cardboard disc to decorate as a pizza. The pizza should already be measured off in tenths. Later cut each pizza into several different-sized slices, e.g., 0.3, 0.6, etc. Using the pizza slices, have the students build whole pizzas (1.0) and record the related addition equations.



$$0.2 + 0.3 + 0.5 = 1.0$$

## 2. Pizza Muffins for Four

4 English Muffins  
some butter or margarine  
0.1 L tomato sauce  
0.1 L cheddar or mozzarella cheese  
a bit of oregano  
a dash of Parmesan cheese  
Toast the muffins. Butter each muffin. Spread on tomato sauce. Sprinkle with the oregano, then with the cheese. Place under the broiler until the cheese bubbles.

## Enrichment

1. Before assigning *Unexpected Company* at the bottom of page 271, have the students recall the meaning of "double".

2. Challenge the students to build ice cream cones to specific values (say 2.0) by adding the numbers on the cone and each scoop.



3. Fasten together several egg cartons. Tape decimal numbers less than 2.0 at the bottom of each depression. In turn, the players toss five table tennis balls (coloured differently for each player) onto the egg-carton grid. The object of the game should be decided before play begins: to accumulate the greatest sum, the least sum, the least difference from 9.9, etc.

## Extra Practice

## Worksheet A55

Pages 270-271

Add or subtract.

- |                                    |                                    |                                    |                                    |                                    |
|------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| 1. $1.3$<br>$-0.7$<br><hr/> $0.6$  | 2. $0.6$<br>$+0.2$<br><hr/> $0.8$  | 3. $0.8$<br>$+0.7$<br><hr/> $1.5$  | 4. $0.9$<br>$-0.2$<br><hr/> $0.7$  | 5. $1.6$<br>$-0.9$<br><hr/> $0.7$  |
| 6. $1.5$<br>$-0.7$<br><hr/> $0.8$  | 7. $0.7$<br>$+0.7$<br><hr/> $1.4$  | 8. $0.5$<br>$+0.8$<br><hr/> $1.3$  | 9. $0.8$<br>$-0.8$<br><hr/> $0.0$  | 10. $1.2$<br>$-0.7$<br><hr/> $0.5$ |
| 11. $1.1$<br>$-0.6$<br><hr/> $0.5$ | 12. $0.7$<br>$+0.3$<br><hr/> $1.0$ | 13. $0.5$<br>$+0.9$<br><hr/> $1.4$ | 14. $1.3$<br>$-0.6$<br><hr/> $0.7$ | 15. $0.8$<br>$+0.9$<br><hr/> $1.7$ |

## Objective N16

Interpret and write decimals to 9.99.

### Introducing the Lesson

Establish the flat (number blocks) as today's whole (one). Recall that the rod represents the *tenth* since 10 rods = 1 flat and 10 tenths = 1 one.

Display a cube (number block). Ask, "If the flat is a one, and the rod is a tenth, what could we call this cube?" Review for the students that 10 cubes = 1 rod and 100 cubes = 1 flat. Write the following for the students.

ones	tenths	hundredths

At this time, justify the choice of the term "hundredths" only by the fact that 100 cubes make one flat.

Using number blocks and the place-value table shown above, count by hundredths (cubes) from 3.15 to 3.35. Stress trading steps where 10 hundredths are traded for 1 tenth. At each step have the students write and read the decimal fraction. Focus on repetitive practice rather than explanation or justification (see below).

ones	tenths	hundredths	decimal	say
3	1	5	= 3.15	"three and fifteen hundredths"
3	1	6	= 3.16	"three and sixteen hundredths"

### Teaching the Lesson

Read and discuss page 272. Note that 3 tenths = 30 hundredths and  $0.3 = 0.30$ . Using the presentation on page 272 as an outline, explain 0.7 and 0.70. Students should be able to explain these equations using number blocks or pictures which they have drawn.

$$\frac{7}{10} = 0.7 \quad \frac{70}{100} = 0.70 \quad 0.7 = 0.70$$

## Hundredths

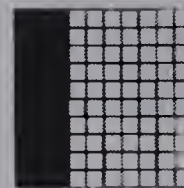
A whole divided into 10 equal parts requires tenths.



$$\frac{3}{10} = 0.3$$

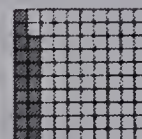
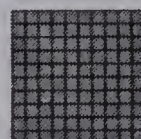
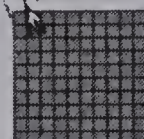
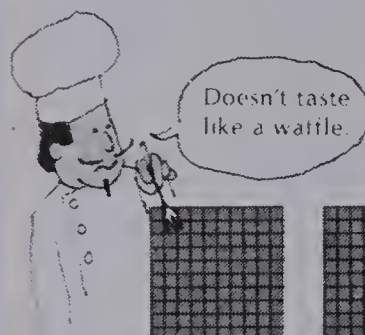
3 tenths

A whole divided into 100 equal parts requires **hundredths**.



$$\frac{30}{100} = 0.30$$

30 hundredths



2.18

2 and 18 hundredths

### EXERCISES

Complete the description.

1.  $\frac{25}{100} = \frac{\blacksquare}{\blacksquare} = 0.\blacksquare\blacksquare\blacksquare$   
 $\blacksquare$  hundredths  
 25

2.  $\frac{71}{100} = \frac{\blacksquare}{\blacksquare} = 0.\blacksquare\blacksquare\blacksquare$   
 $\blacksquare$  hundredths  
 71

3.  $\frac{29}{100} = \frac{\blacksquare}{\blacksquare} = 2.\blacksquare\blacksquare\blacksquare$   
 2 and  $\blacksquare$  hundredths  
 29

4.  $\frac{150}{100} = \frac{\blacksquare}{\blacksquare} = 1.\blacksquare\blacksquare\blacksquare$   
 $\blacksquare$  and  $\blacksquare$  hundredths  
 1 50

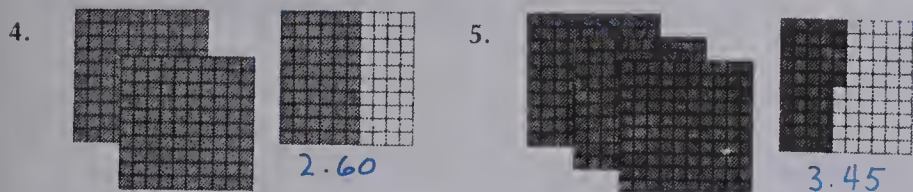
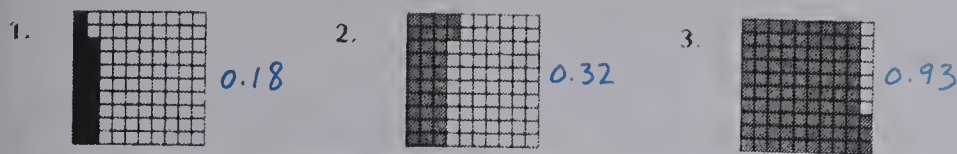
### Using the Exercises

- Questions 1 and 2, dealing with decimals less than 1.00, must be understood before a practice assignment is made. If more examples are required to ensure mastery, use 0.15, 0.50, and 0.95.
- Questions 3 and 4 involve decimals which are greater than 1.00 that utilize hundredths.



# PRACTICE

Write the decimal. ■■■■



6. 25 hundredths 0.25      7. 2 and 35 hundredths 2.35
8. 16 hundredths 0.16      9. 1 and 40 hundredths 1.40
10. 89 hundredths 0.89      11. 6 and 54 hundredths 6.54
12.  $\frac{32}{100}$  0.32      13.  $\frac{12}{100}$  0.12      14.  $\frac{99}{100}$  0.99      15.  $\frac{60}{100}$  0.60      16.  $\frac{6}{100}$  0.06

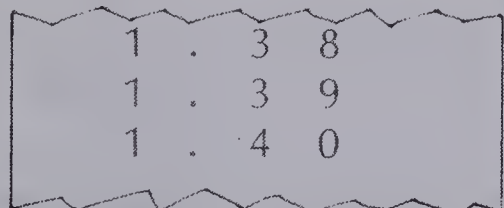
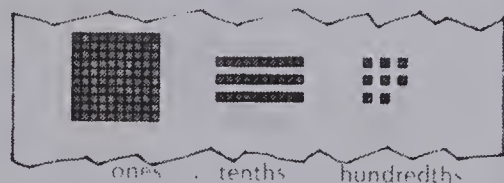
Draw pictures to explain each equation

17. 2 tenths = 20 hundredths      18. 0.40 = 0.4

## Little by Little

Count by hundredths.

1. from 1.38 to 1.55
2. from 4.10 to 4.25
3. from 0.95 to 1.15
4. from 5.85 to 6.05



273

## Extra Practice

Complete the decimal number.

- 56 hundredths = 0.56      2. 4 and 70 hundredths = 4.70
- 6 hundredths = 0.06      4. 2 and 7 hundredths = 2.07
- 6 tenths = 0.6      6. 5 and 7 tenths = 5.7
- $\frac{70}{100} = 0.70$       8.  $\frac{6}{100} = 0.06$       9.  $\frac{6}{10} = 0.6$
- $\frac{25}{100} = 0.25$       11.  $\frac{5}{10} = 0.5$       12.  $\frac{5}{100} = 0.05$

## Worksheet N16

Pages 272-273

## Assigning the Practice

Minimum: 1-15

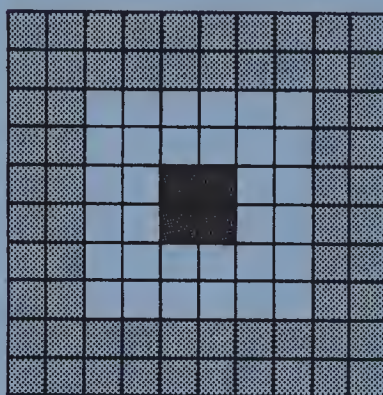
Average: 1-16

Enriched: 1-18

## Reinforcement

1. Provide the materials shown at the bottom of page 273 to assist with the *Little by Little* activity.

2. For practice representing hundredths, ask the students to decorate a hundredths square with crayons and to describe their designs using decimals.

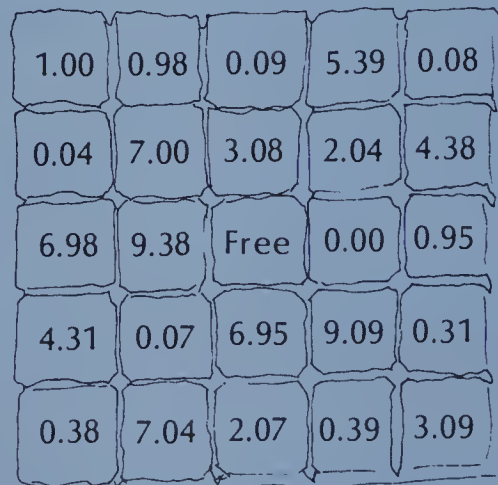


0.64 blue  
0.32 yellow  
0.04 black  
1.00 coloured

## Enrichment

1. Construct a collection of *Decimal Bingo Waffles* using these 24 numbers: 0.01, 0.05, 0.08, 0.09, 0.10, 0.32, 0.39, 0.40, 0.96, 0.99, 1.01, 2.05, 2.08, 3.09, 3.10, 4.32, 4.39, 5.40, 6.96, 6.99, 7.01, 7.05, 9.10, 9.39.

Before each game decide which version of *Decimal Bingo* to play: *one more hundredth* or *one less hundredth*. As the teacher calls a number (2.05), each student plays a chip on the correct number (2.04 or 2.06).



2. Using concrete materials, investigate equations of the following type:

$$\frac{50}{100} = \frac{\blacksquare}{10} \quad 0.50 = 0.\blacksquare$$

3. Provide dot-to-dot puzzles using decimals in the hundredths.

## Objective M18

Use decimals to relate measurements involving centimetres and metres.

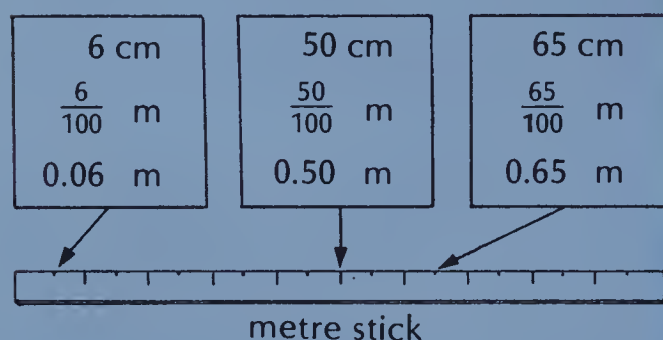
### Introducing the Lesson

Display a metre stick and centimetre cube (number block). Have the students recall that a metre equals 100 cm. Ask what fraction and decimal 1 cm is of 1 m.

Write:

$$1 \text{ cm is } \frac{1}{100} \text{ m} \quad 1 \text{ cm is } 0.01 \text{ m}$$

With masking tape and felt marker, label the following markings on a metre stick in three different ways. Encourage each student to volunteer a label for another marking.



### Teaching the Lesson

Together measure several lengths that are longer than one metre using a metre stick. Fill out a chart as follows. Omit about half the numbers in the second column in converting the measurements to their metre form.

metres and centimetres	centimetres	metres
3 m and 16 cm	316 cm	3.16 m
5 m and 2 cm		5.02 m

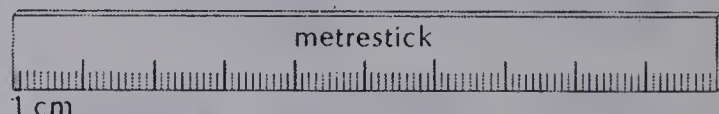
Allowing the students to work in pairs, have them measure lengths from a pre-defined collection using metre sticks. After a 3-minute work session, help record the measurements in the table.

Read and discuss page 274 before assigning the Exercise questions.

## Centimetres as Hundredths

There are 100 cm in a metre.

A centimetre is one hundredth of a metre.



65 cm

112 cm

$$1 \text{ cm} = 0.01 \text{ m}$$

$$65 \text{ cm} = 0.65 \text{ m}$$

$$112 \text{ cm} = 1.12 \text{ m}$$

### EXERCISES

Copy and complete the equation.

1.  $3 \text{ cm} = 0.0\text{■} \text{ m}$   
3

2.  $7 \text{ cm} = \text{■} \text{ m}$   
0.07

3.  $42 \text{ cm} = 0.\text{■}\text{■} \text{ m}$   
4 2

4.  $24 \text{ cm} = \text{■} \text{ m}$   
0.24

5.  $153 \text{ cm} = \text{■}.\text{■}\text{■} \text{ m}$   
1 5 3

6.  $406 \text{ cm} = \text{■}.\text{■}\text{■} \text{ m}$   
4 0 6

7.  $375 \text{ cm} = \text{■} \text{ m}$   
3.75

8.  $102 \text{ cm} = \text{■} \text{ m}$   
1.02

9. How many centimetres are in a metre? 100

10. A centimetre is what fraction of a metre?  $\frac{1}{100}$

11. A centimetre is what decimal of a metre? 0.01

Answer Box	
$\frac{1}{100}$	200
0.10	$\frac{1}{10}$
100	0.01

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### Using the Exercises

- The Exercises are organized in a way similar to the examples at the top of the page. The first question of each type (questions 1, 3, 5, and 6) provide the students with a hint of the places needed in their answers. Questions 9 to 11 summarize the relationship of the units centimetre and metre.



## PRACTICE

Change these measurements to metres.

1. 214 cm **2.14** 2. 12 cm **0.12** 3. 100 cm **1.00** 4. 7 cm **0.07**
5. 576 cm **5.76** 6. 98 cm **0.98** 7. 300 cm **3.00** 8. 2 cm **0.02**
9. 785 cm **7.85** 10. 70 cm **0.70** 11. 500 cm **5.00** 12. 1 cm **0.01**

Write these measurements as metres

13. 1 m and 35 cm **1.35 m** 14. 3 m and 84 cm **3.84 m** 15. 4 m and 50 cm **4.50 m**
16. 2 m and 6 cm **2.06 m** 17. 3 m and 10 cm **3.10 m** 18. 4 cm and 1 cm **0.05 m**

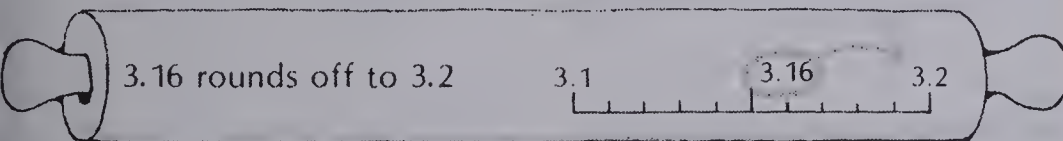
19. Copy and complete the table.

	Estimate in metres	Measurement (your choice)	Measurement in metres
door height	■.■.■		■.■.■
window width	■.■.■		■.■.■
room length	■.■.■		■.■.■
room width	■.■.■		■.■.■

Answers will vary.

## Kitchen Roundup

Round off these kitchen lengths to the nearest tenth of a metre.



		Between	Rounded Off
1. refrigerator height	1.61 m	1.6 m and 1.7 m	<b>1.6 m</b>
2. counter length	2.36 m	<b>2.3 m and 2.4 m</b>	<b>2.4 m</b>
3. dish washer height	0.84 m	<b>0.9 m and 1.0 m</b>	<b>1.0 m</b>
4. sink width	0.52 m	<b>0.5 m and 0.6 m</b>	<b>0.6 m</b>
5. cabinet length	2.45 m	<b>2.4 m and 2.5 m</b>	<b>2.5 m</b>

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## Extra Practice

## Worksheet M18

Pages 274-275

Complete the table.

Answers will vary.

	Estimate in Metres	Measurement in Centimetres	Measurement in Metres
door width			
window height			
chalkboard width			
chalkboard height			
room height			

## Assigning the Practice

Minimum: 1-19

Average: 1-19

Enriched: 1-19

## Reinforcement

1. Supply at least 10 pieces of shoe-string licorice of widely varying lengths. Have each student measure the licorice using a metre stick and record the lengths in metres to the hundredths place. Each student receives a licorice string for a correct or corrected version of the assignment.

2. Organize a *metric track meet* to be held in a classroom or gym. Events may include: standing broad jump, hop-skip-jump, 3-second dash, medicine ball throw, legs jump up, ... Record all measures in metres to the nearest hundredths.

## Enrichment

1. In preparation for *Kitchen Roundup* at the bottom of page 275, use a metre stick to discuss rounding off lengths to the nearest tenth of a metre. If necessary, recall the work on rounding off found on pages 172-173.

2. Have the students prepare a *Classroom Roundup* worksheet. To assist their work, provide them with blank tables like the following:

	Measurement	Between	Rounded Off
1.	— . — — m	— and —	
2.	— . — — m	— and —	
3.	— . — — m	— and —	
4.	— . — — m	— and —	

## Objective PS21

Use addition or subtraction with amounts to \$9.99.

## Teaching the Lesson

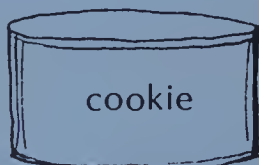
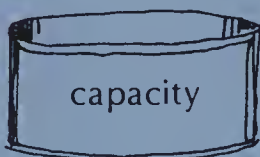
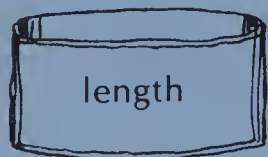
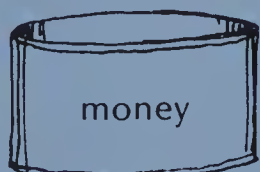
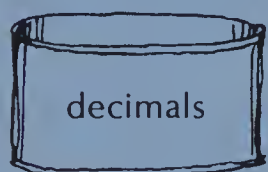
Review addition and subtraction of money with the problems below. Have students demonstrate several problems using one-dollar bills, dimes, and pennies to model each step (as in Units 4, 5, 9, and 10).

\$6.31	\$7.38	\$2.67	\$4.04
+1.98	-1.65	+1.75	-2.35
\$ .	\$ .	\$ .	\$ .

To prepare the students for questions 9 to 14 have them suggest the appropriate operation (addition or subtraction) to these phrases:  
 How much in all ...      The total cost ...  
 How much more than ...      The difference ...

## Reinforcement

Place cookie-shaped, word-problem work cards in four wide-mouth cans. Each work card should contain an addition and subtraction story problem involving tenths or hundredths. Label the four cans by topic as follows:  
 1. decimals, 2. money, 3. length, and 4. capacity. Those who finish four work cards earn a real cookie from the fifth can.

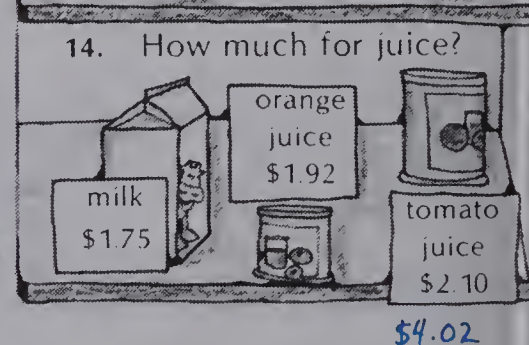
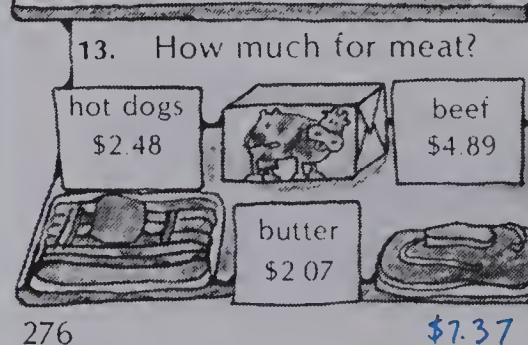
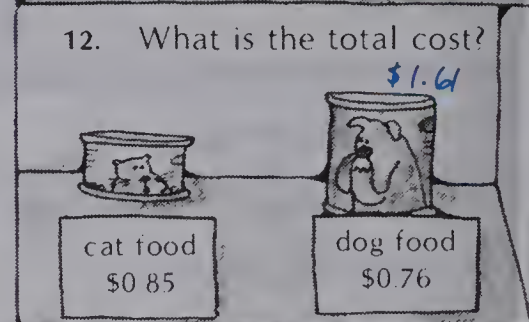
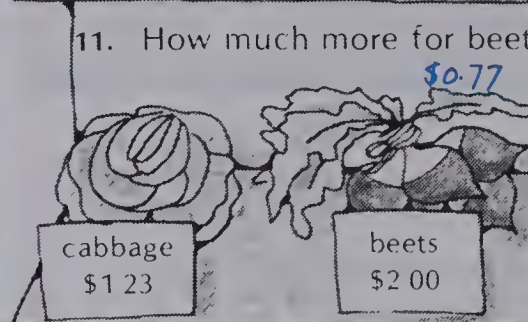
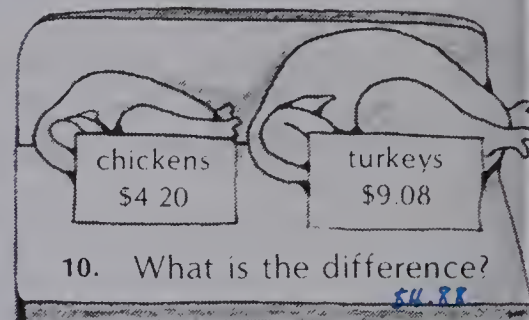
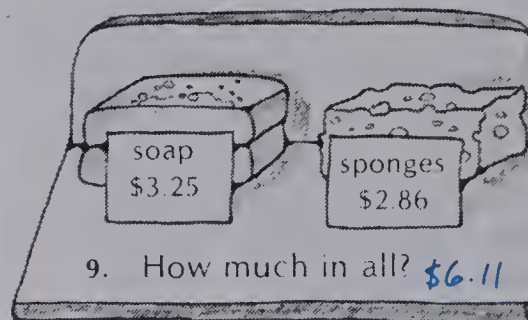


# Dollars and Cents

P & S Market

Addition Review	
1. \$3.25 + 4.15 \$7.40	2. \$1.35 + 4.85 \$6.20
3. \$0.45 + 2.83 \$3.28	4. \$3.88 + 1.88 \$5.76

Subtraction Review	
5. \$4.86 - 3.70 \$1.16	6. \$6.25 - 2.09 \$4.16
7. \$7.62 - 0.98 \$6.64	8. \$7.04 - 1.38 \$5.66



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- Use real or play money and count out 100 pennies. Establish the fact that a dollar bill and 100 pennies represent the same amount of money. Since this is true, then one penny represents one hundredth of a dollar which can be written \$0.01 or 1¢. Students may take turns removing a few pennies from the 100 pennies and stating or writing the amount taken in terms of a fraction of a dollar.

**Example:** 23 pennies = 23¢ = \$0.23 (twenty-three hundredths of a dollar).

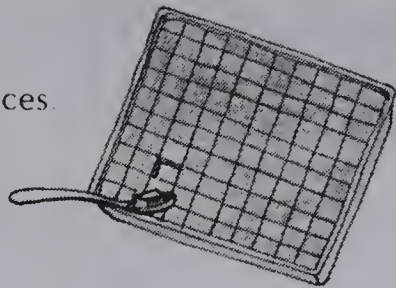
## Problem Solving Activities

Assign Level 3, Unit 14.



Pieces of Fudge

Brad cut a batch of fudge into 100 pieces.  
One piece is 0.01 of a batch.  
Brad charges \$0.01 (one cent)  
for each piece of fudge.  
Complete Brad's sale sign.



**Sale**

1. 1 piece	0.01 of a batch costs	\$0.01
2. 4 pieces	0.04 of a batch costs	\$0.04
3. 15 pieces	0.15 of a batch costs	\$0.15
4. 60 pieces	0.60 of a batch costs	\$0.60
5. 235 pieces	2.35 batches cost	\$2.35
6. 100 pieces	1.00 batch costs	\$1.00

REVIEW

Choose the better answer.

M17 1. L litre 2. milk 0.1 L or 1 L? 3. 1/2 0.5 0.5 or 5.0?

A55 4. 0.5 + 0.4 = 0.9 5. 0.6 + 0.5 = 1.1 6. 0.8 - 0.3 = 0.5 7. 1.2 - 0.9 = 0.3

N16 Write the decimal. 8. 25/100 0.25 9. 18/100 0.18 10. 10/100 0.10 11. 3/100 0.03

M18 Write as metres. 12. 100 cm 1.00 m 13. 200 cm 2.00 m 14. 85 cm 0.85 m 15. 5 cm 0.05 m

Objective PS22

Relate amounts to \$9.99 with decimal numbers.

Teaching the Lesson

Recall that 1 dime = 10¢ = 10 pennies  
and 1 dollar = 100¢ = 100 pennies.  
Through discussion and use of money  
determine:

1 penny	= 1/100 dollar	= 0.01 dollar
5 pennies	= 5/100 dollar	= 0.05 dollar
25¢	= 25/100 dollar	= 0.25 dollar
50¢	= 50/100 dollar	= 0.50 dollar
\$0.75	= 75/100 dollar	= 0.75 dollar
\$0.05	= 5/100 dollar	= 0.05 dollar

Discuss these equations.  
\$0.10 = 0.10 dollar, \$1.00 = 1.00 dollar  
\$3.00 = 3.00 dollars, \$1.25 = 1.25 dollars,  
and \$3.06 = 3.06 dollars

Display a large replica of a one-dollar  
bill partitioned by a 10 by 10 grid. In a  
humorous vein, tear off parts and ask  
what these decimal parts of the dollar  
are worth.

\$1 grid

0.01 dollar → (\$0.01 = 1¢)  
0.23 dollar → (\$0.23 = 23¢)  
0.70 dollar → (\$0.70 = 70¢)

Review Exercises

Questions	Objective	Pages
1-3	M17	268-269
4-7	A55	270-271
8-11	N16	272-273
12-15	M18	274-275

Reinforcement

Ask the students to make cardboard  
jigsaw squares similar to those shown  
below. Mix the puzzles together in a  
cracker tin. Provide a scoreboard for  
individuals to record the time needed  
to reconstruct all the squares.

Jigsaw puzzle pieces showing decimal relationships:

- 4/100 hundredths → 0.04 → 4¢
- 400/100 hundredths → 4.00 → 400¢

Extra Practice

Worksheet PS21-PS22

Pages 276-277

hot dogs \$3.24	peas \$1.63	hamburger \$4.38	beans \$2.47
--------------------	----------------	---------------------	-----------------

- How much for meat? \$7.62      2. How much for vegetables? \$4.10
- How much more for beans than for peas? \$0.84      4. How much more for hamburger than for beans? \$1.91

Unit 14 Objective	Test Questions	Pages
N13	1-4	262-263
N14	5-7	264-265
N15	8-9	266-267
M17	10-13	268-269
A55	14-17	270-271
N16	18-21	272-273
M18	22-24	274-275
PS21	25-28	

# TEST

# UNIT 14

Write the decimal.

1.  $\frac{5}{10}$   
0.5

2. one tenth  
0.1



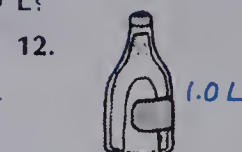
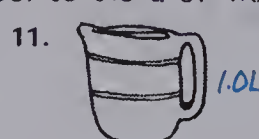
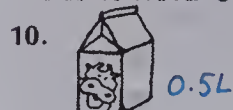
5. six and four tenths  
6.4



8. Which is greater?  
3.6 or 6.3

9. Put these in order.  
0.7, 2.4, 2.7, 0.4  
0.4, 0.7, 2.4, 2.7

Does it hold closer to 0.5 L or 1.0 L?



Add or subtract.

14.  $\begin{array}{r} 0.4 \\ + 0.2 \\ \hline 0.6 \end{array}$

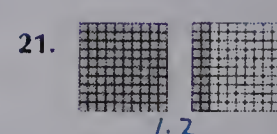
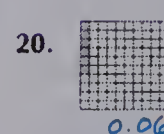
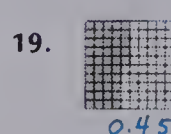
15.  $\begin{array}{r} 0.4 \\ + 0.8 \\ \hline 1.2 \end{array}$

16.  $\begin{array}{r} 0.5 \\ - 0.2 \\ \hline 0.3 \end{array}$

17.  $\begin{array}{r} 1.0 \\ - 0.7 \\ \hline 0.3 \end{array}$

Write the decimal.

18.  $\frac{17}{100}$   
0.17



Change to metres. ■■■ m

22. 43 cm  
0.43 m

23. 250 cm  
2.50 m

24. 3 m and 18 cm  
3.18 m

Add or subtract.

25.  $\begin{array}{r} \$3.72 \\ + 1.19 \\ \hline \$4.91 \end{array}$

26.  $\begin{array}{r} \$7.23 \\ - 0.82 \\ \hline \$6.41 \end{array}$

27.  $\begin{array}{r} \$4.56 \\ + 2.58 \\ \hline \$7.14 \end{array}$

28.  $\begin{array}{r} \$5.00 \\ - 1.25 \\ \hline \$3.75 \end{array}$

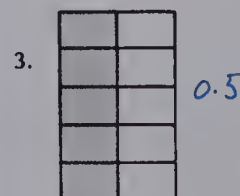
## Post-test

## Unit 14

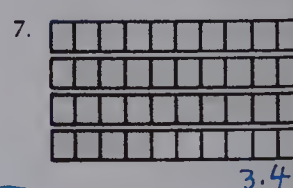
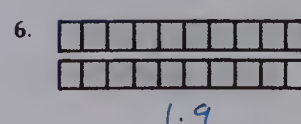
Write the decimal.

1.  $\frac{3}{10}$  0.3

2. six tenths  
0.6



5. two and one tenth  
2.1



Which is greater?

8. 4.5 or 5.4

9. 7.6 or 8.7

Is it closer to 0.1 L or 1.0 L?

10. 1.2 L  
1.0 L

11. 0.2 L  
0.1 L

12. 0.9 L  
1.0 L

13. 0.3 L  
0.1 L



Divide.

1.  $24 \div 4$  **6**
2.  $4 \overline{)61R2}$
3.  $15 \div 3$  **5**
4.  $3 \overline{)15}$  **5**
5.  $5 \overline{)91R4}$
6.  $2 \overline{)136R1}$
7.  $4 \overline{)358R3}$
8.  $3 \overline{)113R2}$
9.  $6 \overline{)36}$  **6**
10.  $6 \overline{)18}$  **3**
11.  $6 \overline{)48}$  **8**
12.  $6 \overline{)54}$  **9**
13.  $7 \overline{)21}$  **3**
14.  $7 \overline{)42}$  **6**
15.  $7 \overline{)436R1}$
16.  $7 \overline{)56}$  **8**

Copy and complete the tables.

17.

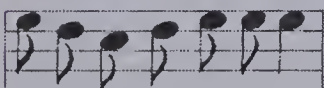
$\div$	8
40	<b>5</b>
64	<b>8</b>
56	<b>7</b>
24	<b>3</b>
72	<b>9</b>

18.

$\div$	9
36	<b>4</b>
63	<b>7</b>
45	<b>5</b>
54	<b>6</b>
27	<b>3</b>

If you have 42 notes, how many bars of music can you make?

19. 6 notes in each bar **7**
20. 7 notes in each bar **6**
21. 8 notes in each bar **5 R2**
22. 9 notes in each bar **4 R6**



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Add or subtract.

4.  $0.9 - 0.3$   
**0.6**
15.  $1.3 - 0.9$   
**0.4**
16.  $0.8 + 0.6$   
**1.4**
17.  $0.5 + 0.5$   
**1.0**

Write the decimal.

8.  $\frac{28}{100}$   
**0.28**
19. **0.45**
20. **0.13**
21. 8 and 6 hundredths  
**8.06**

Change to metres. ■ . ■ ■ m

2. 280 cm **2.80 m**
23. 72 cm **0.72 m**
24. 6 m and 29 cm **6.29 m**

Add or subtract.

5.  $\$3.28 + 2.51$   
**\\$5.79**
26.  $\$3.84 + 0.29$   
**\\$4.13**
27.  $\$6.42 - 1.14$   
**\\$5.28**
28.  $\$8.48 - 2.59$   
**\\$5.89**

# UNIT 15

## Multiplication

Theme: Summer Fun

Lesson		Objective	Vocabulary	Materials
Preview		Review multiplication facts with products to 81.		
1	M19	Find volume using non-standard units.	volume, inside space	coffee cup, math book, ball, sugar cubes, marshmallows
2	M20	Find volume using cubic centimetres as the standard unit.	cubic centimetres, cube, standard unit	centimetre cubes
3	PS23	Choose the kind of measurement and the way of measuring.	kind of measurement, way of measuring	metre stick, litre container, centimetre cubes and squares, scale, clock
	PS24	Choose the operation needed to solve word problems.		
4	N17	Introduce Roman numerals to 20.	Roman numerals	
5	A56	Multiply a one-digit number by 10 and 100.	tens, hundreds	number blocks (rods and flats)
6	A57	Multiply a one-digit number by a multiple of 10.	multiple	number blocks
7	A58	Multiply a one-digit number by a two-digit number, without regrouping.	ones, tens	number blocks
8	A59	Multiply a one-digit number by a two-digit number, regrouping the ones.	regrouping ones	number blocks
Test		Multiplication		
Review		Decimals		



# About This Unit

The primary aim of Unit 15 is to extend the multiplication concept introduced with the basic facts in Units 7 and 12 to include the multiplying of a one-digit number by a two-digit number, with and without regrouping (Lessons 5-8).

The step-by-step development of the multiplication algorithm for products to 99 relies on several prerequisites:

1. knowledge of basic multiplication facts;
2. translation of multiplication as repeated addition, and vice versa;
3. familiarity with number blocks to hundreds;
4. place-value knowledge of 4 tens as 40, 6 hundreds as 600;
5. place-value knowledge of regrouping ones into tens and ones.

All of these prerequisite skills have been introduced and developed in previous units of the Grade 3 book. Consequently, they are reviewed quickly prior to their use in the appropriate lessons. Unit 15 also includes the following topics.

- Volume, using both non-standard and standard units (Lessons 1 and 2).
- Problem solving (Lesson 3).
- Roman numerals (Lesson 4).

The activity work cards for measurement centres that were introduced in Unit 6 are continued in the two lessons on volume (see the Reinforcement and Enrichment ideas in both lessons). As in Unit 6, these ideas can be used either as work cards as shown or as worksheets.

# Ideas

The integrative theme of Unit 15 is *Summer Fun*. This theme should tie in with year-end thoughts and activities. The following activities include ideas for creating a summer atmosphere in the classroom and for integrating other subjects with mathematics.

1. Prepare a classroom mural of summer activities. Each student can make a contribution to the mural by drawing or constructing one activity he or she plans to do during the holidays.
2. Attach written descriptions of each student's summer plans to the mural.
3. Summer travel plans could lead into social studies or mathematics lessons on:
  - a. the geography of the area (using maps)
  - b. gas consumption and the cost of gasoline, if travelling by car
  - c. sights to see along the way or in the area
  - d. provincial parks
  - e. what to pack if travelling by car or by plane.
4. Write to the local travel bureau, Chamber of Commerce, or automobile club for detailed maps and brochures.

# UNIT 15

## MULTIPLICATION



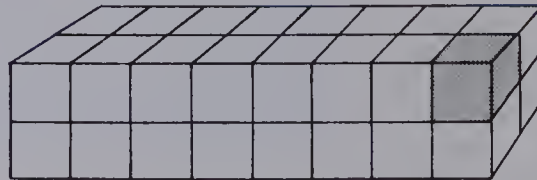
Unit 15 Objectives	Test Questions	Pages
M19	1-4	282-283
M20	5	284-285
N17	6	288-289
A56	7-10	290-291
A57	11-14	292-293
A58	15-18	294-295
A59	19-22	296-297
PS	23-24	

### Pretest

Unit 15

Does it suggest **volume** or **area**?

1. a shoe box **volume**
2. a book cover **area**
3. an aquarium **volume**
4. an envelope **area**
5. What is the volume?



one cubic centimetre

**32 cubic centimetres**

6. What is the Roman numeral VII in standard form? **7**

Multiply.

7.  $3 \times 10 =$  **30**
8.  $6 \times 100 =$  **600**
9.  $10 \times 9 =$  **90**
10.  $100 \times 7 =$  **700**



# Knock Knock



O L I V E    T H E  
 49 56 24 0 48    45 54 48  
 18 72 12 12 48 32    54 49 56 24 7 21 36 18  
 S U M M E R    H O L I D A Y S

Multiply and decode the message.

A. $3 \times 7 = 21$	B. $2 \times 8 = 16$	C. $5 \times 5 = 25$	D. $7 \times 1 = 7$
E. $6 \times 8 = 48$	F. $3 \times 9 = 27$	G. $4 \times 5 = 20$	H. $9 \times 6 = 54$
I. $4 \times 6 = 24$	J. $7 \times 5 = 35$	K. $6 \times 6 = 36$	L. $8 \times 7 = 56$
M. $3 \times 4 = 12$	N. $8 \times 5 = 40$	O. $7 \times 7 = 49$	P. $6 \times 7 = 42$
Q. $4 \times 8 = 32$	R. $3 \times 6 = 18$	T. $5 \times 9 = 45$	U. $9 \times 8 = 72$
V. $0 \times 7 = 0$	W. $7 \times 9 = 63$	X. $9 \times 4 = 36$	Z. $8 \times 8 = 64$

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## UNIT 15 PREVIEW

### Suggestions

Ask the students briefly to tell about their summer holiday plans. Make a list on the chalkboard of the activities mentioned. Have the students categorize them under such headings as, travel, sports, camp, or games.

Discuss the summer activities pictured on the title page for Unit 15, page 280.

### About the Page

Ask students for other Knock Knock jokes. A joke book from the library would be a useful reference.

This page reviews some of the multiplication facts to 81. Have the students read aloud and answer each "olive" before decoding the message in their notebooks.

The message reads "Olive the Summer Holidays". Read aloud to emphasize the inflection of "olive" as "I love".

### Reinforcement

Provide flash cards to practise the multiplication facts to 81. Have a series of 5 daily written quizzes of 10 questions each to determine the class speed and accuracy in recalling these facts.

### Enrichment

Have the students make up their own Knock Knock jokes and secret messages. Show them how to decode the messages with the products to 81 and then to add fillers as distractors.

11.  $8 \times 40 = 320$     12.  $5 \times 20 = 100$     13.  $9 \times 90 = 810$     14.  $7 \times 60 = 420$

15. $\begin{array}{r} 33 \\ \times 3 \\ \hline 99 \end{array}$	16. $\begin{array}{r} 13 \\ \times 2 \\ \hline 26 \end{array}$	17. $\begin{array}{r} 22 \\ \times 3 \\ \hline 66 \end{array}$	18. $\begin{array}{r} 41 \\ \times 2 \\ \hline 82 \end{array}$
--	--	--	--

19. $\begin{array}{r} 56 \\ \times 3 \\ \hline 168 \end{array}$	20. $\begin{array}{r} 18 \\ \times 7 \\ \hline 126 \end{array}$	21. $\begin{array}{r} 59 \\ \times 8 \\ \hline 472 \end{array}$	22. $\begin{array}{r} 37 \\ \times 6 \\ \hline 222 \end{array}$
---	---	---	---

- olve.
- |   |  |
|---|--|
| 3. 6 classrooms.<br>25 students in each.<br>How many students in all?<br><b>150</b> | 24. 5 minutes.<br>72 heartbeats in one minute.<br>How many heartbeats in five minutes?<br><b>360</b> |
|---|--|

### Problem Solving Activities

Assign Level 3, Unit 15.

## Objective M19

Find volume using non-standard units.

### Introducing the Lesson

Display three objects: a coffee cup, math book, and ball. Explain that today we want to measure the *inside space* of each object displayed. "Some objects can be filled. We will have to pretend that other objects are hollow. Let's measure with sugar cubes and marshmallows."

### Teaching the Lesson

Have the students estimate the number of sugar cubes and marshmallows each object will hold. Encourage the use of a chart to organize their work.

	Coffee Cup	
	Estimate	Actual Number
Sugar cubes		
Marshmallows		

	Math Book	
	Estimate	Actual Number
Sugar cubes		
Marshmallows		

	Ball	
	Estimate	Actual Number
Sugar cubes		
Marshmallows		

Call on volunteers to "fill" or "build" each object with the sugar cubes and marshmallows. Count the number of each needed. Discuss how close their estimates were. Discuss which measure is more accurate (sugar cubes) and why. *Square corners fit together.*

Read page 282 together.

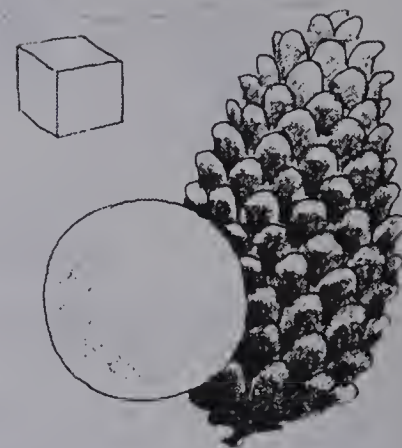
# Volume

The **volume** of a solid is a measure of its inside space.

Sometimes you must pretend the solid is hollow.

A pine cone would hold about 20 sugar cubes.

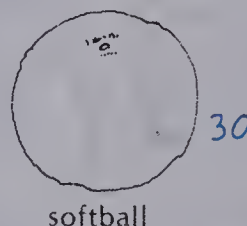
A ping pong ball would hold about 8 sugar cubes.



## EXERCISES

Estimate the **volume** for each.

1. 3 or 30 sugar cubes



2. 9 or 90 sugar cubes



3. a pan



60 or 600 pine cones 60

4. a runner



5 or 50 pine cones 5

5. a tent



90 or 9000 pine cones 9000

## Using the Exercises

- Questions 1 to 5 involve choosing the most reasonable estimate of volume using two non-standard units, sugar cubes and pine cones.



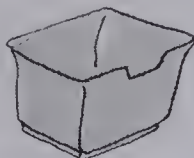
## PRACTICE

Estimate and measure the volume of each.  
Use the sugar cube as the unit.

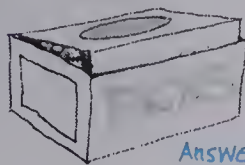
1. egg cup  
5



2. ice cube  
cup 10



3. tacks box  
6



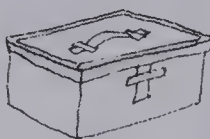
4. staples box  
20



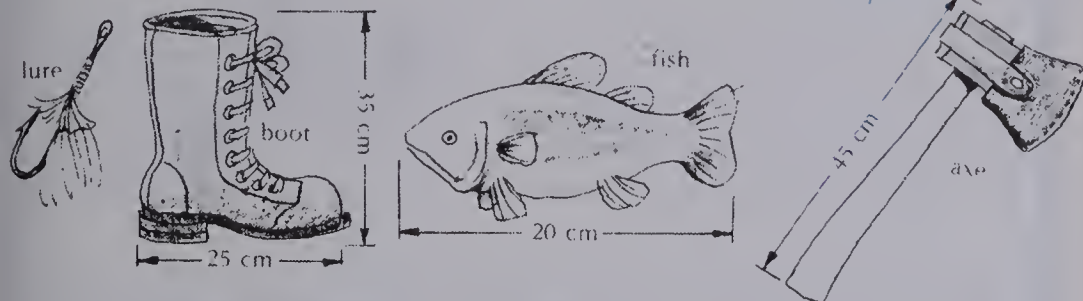
Answers may vary.

## Bigger than a Bread Box

Mr. Brown has a camping bread box  
15 cm wide, 30 cm long, and 20 cm tall. His small  
brown bread just fits inside the 15 cm by 30 cm by 20 cm box.



1. Which items will fit in Mr. Brown's bread box? *lure, fish*



Will Mr. Brown's brown bread fit inside these?

2. a 30 cm by 30 cm by 5 cm box *no*
3. a 30 cm by 20 cm by 25 cm box *yes*
4. a 20 cm by 10 cm by 20 cm box *no*
5. a 20 cm by 30 cm by 15 cm box *yes*

283

## Assigning the Practice

Minimum: 1-4

Average: 1-4

Enriched: 1-4

## Reinforcement

Provide five boxes of varying sizes  
labelled A, B, C, D, and E, and enough  
sugar cubes to measure their volumes.

### Volume Activity 1

List the boxes from smallest to largest  
according to volume.

Use the sugar cubes to find their  
volumes.

### Volume Activity 2

Name three objects in the classroom  
that are:

- a. 1 marshmallow in volume
- b. 10 marshmallows in volume.

## Enrichment

1. Assign *Bigger Than a Bread Box* at  
the bottom of page 283.

2. Display the three-dimensional  
shapes introduced in Unit 9.

### Volume Activity 3

Estimate the volume of a cube, sphere,  
pyramid, cylinder, and cone in sugar  
cubes. Check how close your estimates  
are by building each shape with the  
sugar cubes and counting the number  
used.

Note: Answers will vary by 1 to 3 cubes.

## Extra Practice

## Worksheet M19

Pages 282-283

Estimate and measure the volume of 8 things.  
Use a sugar cube as the unit.

Answers will vary.

Name of item	Estimate	Actual number

## Objective M20

Find volume using cubic centimetres as the standard unit.

### Introducing the Lesson

Draw a 1 cm line on the chalkboard. Ask, "How long is the line?" Explain that we use centimetres to measure length, e.g., "How long is our math book? How tall are you?" Ask for other examples of length. Write 1 cm below the line.

Draw a square centimetre on the chalkboard. Ask how long and how wide the figure is. Have the students recall that we use square centimetres to measure area or the surface of objects, e.g., area of a hand print, desk top, etc. Ask for other examples. Write  $1\text{ cm}^2$  below the square.

### Teaching the Lesson

Hand out a one centimetre cube to each student. Ask how long, how wide, and how tall it is. Draw it on the chalkboard. Explain that a shape with three equal dimensions (length, width, height) is called a cube. Since it measures 1 cm in length for each of its three dimensions, it is called a cubic centimetre. Introduce and write the symbol  $1\text{ cm}^3$  below the drawing of the cube.

Discuss the need for a standard unit by comparing  $1\text{ cm}^3$  with a sugar cube, pine cone, or marshmallow.

Build a  $6\text{ cm}^3$  shape. Ask, "How many cubic centimetres?" Explain that  $6\text{ cm}^3$  is the volume of this shape. Divide the students into groups of 6 to combine their cubes to build different  $6\text{ cm}^3$  shapes. The only rule is that the edges must match completely from corner to corner. Provide additional cubes for the students to build  $10\text{ cm}^3$  objects.

Read and discuss page 284 together. Have the students build the  $10\text{ cm}^3$  object shown on the page.

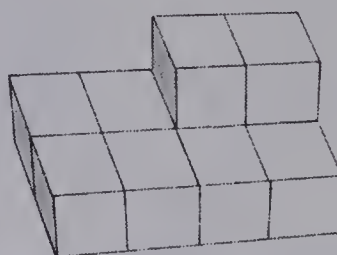
## Finding Volume

You measure area in square centimetres.

You measure volume in **cubic centimetres**.



A **cubic centimetre** is 1 cm wide  
1 cm long, and  
1 cm tall.

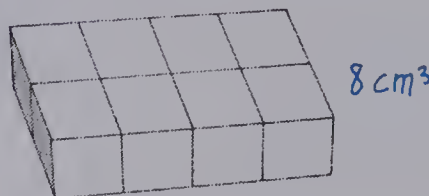


The volume of the yellow solid is 10 cubic centimetres.

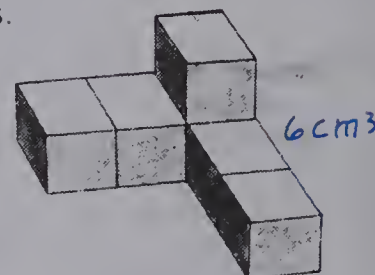
### EXERCISES

Give the volume in cubic centimetres.

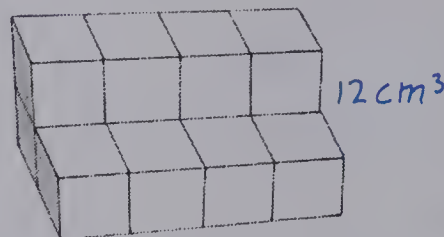
1.



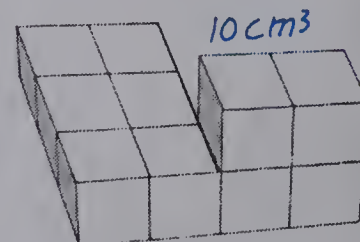
2.



3.



4.



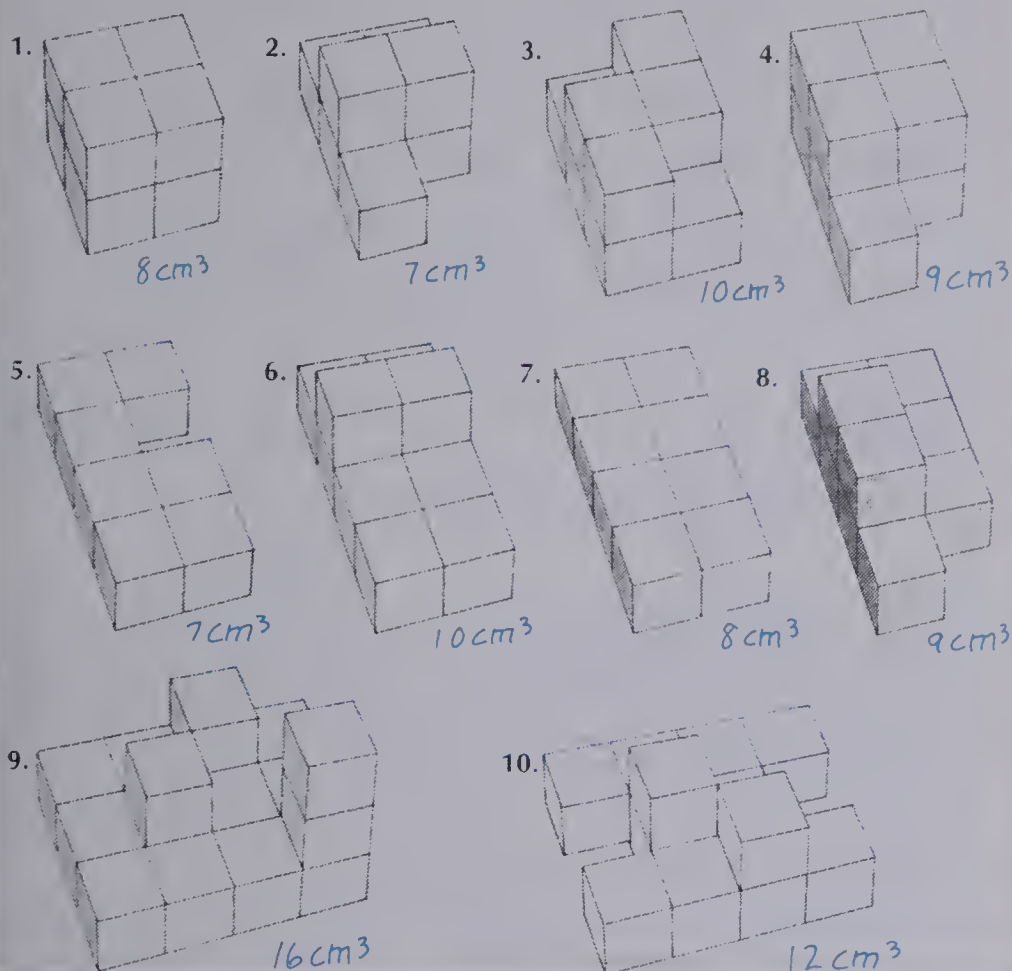
### Using the Exercises

- Questions 1 to 4 ask the students to find the volume in cubic centimetres. Since questions 2, 3, and 4 require visualization of hidden cubes, allow the students to use their cubes to help them.



## PRACTICE

Give the volume in cubic centimetres.



## Betty Brackets

Find the product.

1.  $(3 \times 4) \times 2$   $24$  2.  $5 \times (2 \times 4)$   $40$
3.  $(3 \times 3) \times 5$   $45$  4.  $3 \times (2 \times 2)$   $12$   $(2 \times 3) \times 4 = 24$
5.  $(1 \times 6) \times 7$   $42$  6.  $8 \times (3 \times 2)$   $48$  6



285

## Assigning the Practice

Minimum: 1-10

Average: 1-10

Enriched: 1-10

## Reinforcement

1. Assign *Betty Brackets* at the bottom of page 285.

2. Have the students work in groups of two, three, or four as they do the following activity.

### Volume Activity 4

Build several different shapes with a volume of  $8\text{ cm}^3$ , of  $12\text{ cm}^3$ .

3. Have the students work in pairs for this activity.

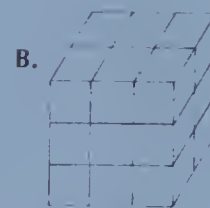
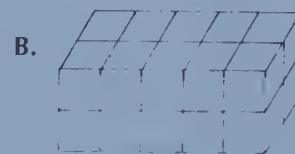
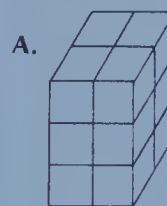
### Volume Activity 5

Build a shape. Ask a partner to find the volume. Check by counting the cubes.

## Enrichment

### Volume Activity 6

Which has the greater volume? A or B?



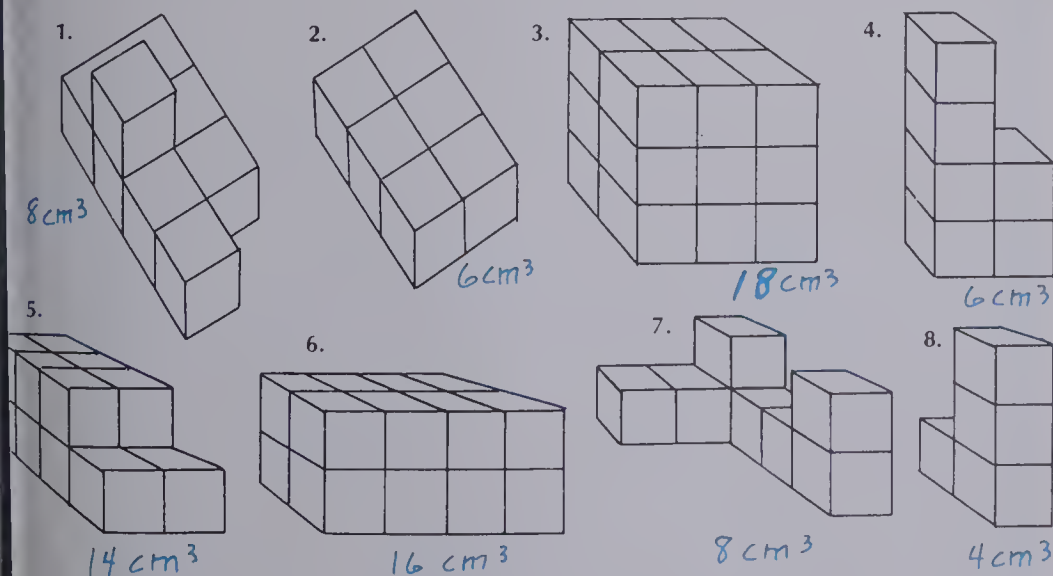
### Volume Activity 7

Build to find the volume with cubic centimetres.

	Length	Width	Height	Volume
A	2	2	1	?
B	3	2	4	?
C	2	2	2	?

## Extra Practice

Estimate and measure the volume in cubic centimetres.



## Worksheet M20

Pages 284-285

### Objective PS23

Choose the kind of measurement and the way of measuring.

### Introducing the Lesson

Display the following measuring instruments: metre stick, litre container, cubic centimetre, scale, square centimetre, and a clock. Discuss what each item measures through real-life examples, e.g., a scale is used to find the mass of things, like potatoes.

Explain that these are measuring instruments. They give us a **way to measure** in standard units.

### Teaching the Lesson

Write the kinds of measurement on the chalkboard – area, mass, liquid capacity, length, time, volume. Explain that these are the **kinds of measurement** we have been studying this year. They tell us what kind of measurement we are making. Have the students match each kind of measurement to the measuring instruments displayed.

Write, “About 410 cm<sup>2</sup> cover this book.” on the chalkboard. Ask the students what kind of measurement is being made and in what way it is being measured. *Area, in square centimetres.*

Assign the six questions in the exercise on page 286.

### Reinforcement

Ask the students to match the symbols in column A to the kinds of measurement in column B.

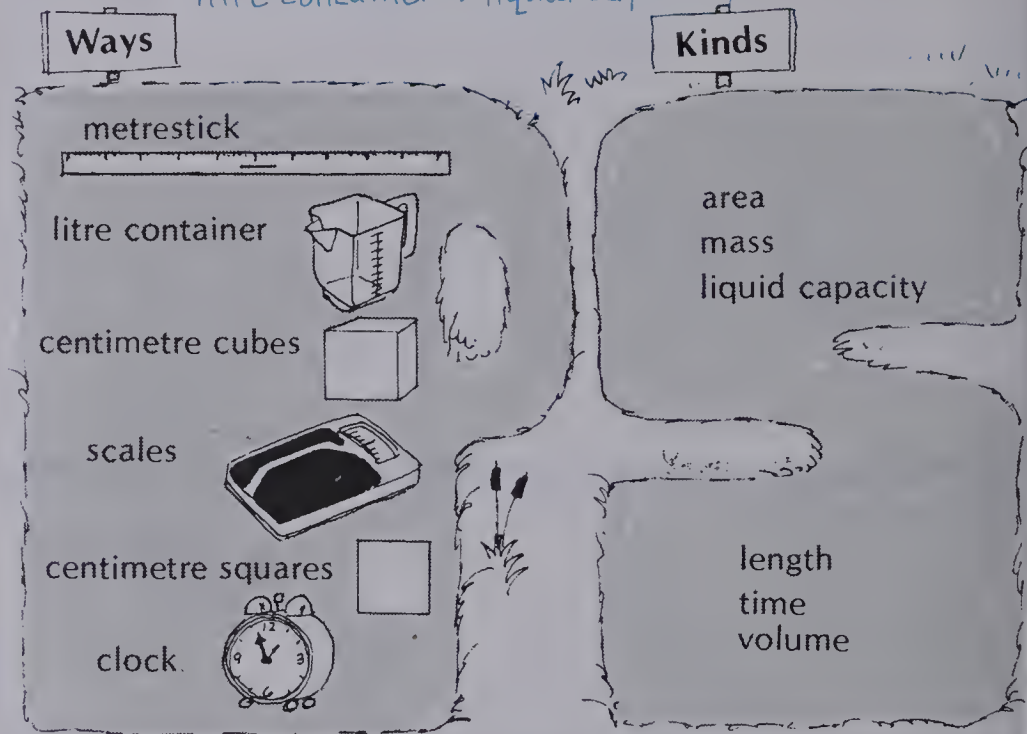
A	B
kg	area
cm	length
minutes	time
cm <sup>2</sup>	volume
mL	mass
g	capacity
cm <sup>3</sup>	
day	
L	

## Measurement Choices

Mary measured things at camp.

For each sentence choose a **kind** of measurement and a **way** for measuring.

- Mary hiked for 40 minutes around a lake. *clock → time*
- She found a one-kilogram rabbit. *scales → mass*
- The rabbit could jump 35 cm. *metre stick → length*
- It had a spot covering 13 square centimetres. *centimetre squares → area*
- Mary put Spot in an 8000 cubic centimetre box. *centimetre cubes → volume*
- Spot drank 0.1 L of water before escaping. *litre container → liquid capacity*








# OPeration Choices

Choose **addition**, **subtraction**, **multiplication**, or **division**.  
Find the answer.

1. *multiplication*  
The children came to camp in 7 cars. Each car held 6 children. How many children came? *42*

2. *addition*  
Sukhjot caught 37 , 17 , and 53 . How many bugs did he catch in all? *107*

3. *subtraction*  
Aaron brought \$1.36. He lost 48¢ in the pond. How much was left? *88¢*

4. *division*  
The 36 boys split into 9 teams. How many were on each team? *4*

5. *multiplication*  
Fran took three 8-minute rests. How long did she rest? *24 min*

6. *subtraction*  
The cake covered 910 square centimetres. In 2 minutes, 735 square centimetres was gone. How much was left? *175 cm<sup>2</sup>*

7. *division*  
Seven girls shared a 49 cubic centimetre box of raisins. How much did each girl get? *7 cm<sup>3</sup>*

287

## Objective PS24

Choose the operation needed to solve word problems.

## Introducing the Lesson

Ask the students to name the four operations in arithmetic. *Addition, subtraction, multiplication, and division*. Write them on the chalkboard. Emphasize correct pronunciation by practising them aloud.

## Teaching the Lesson

Display the following problems on the chalkboard, overhead projector, or chart paper. Work together to match each problem with the operation needed to solve it. Do not solve the problems.

- Jason collected 32 shells. Jody collected 17 pieces of driftwood. How many more pieces does Jody have to collect to match the number of items in Jason's collection?
- Jason collected 32 shells. Jody collected 17 pieces of driftwood. How many things did the children collect in all?
- The swim club has 6 teams with 4 swimmers on each team. How many swimmers are in the club?
- Scott sold 9 glasses of lemonade at 7¢ each. How much money did he make?
- A watermelon was cut into 32 pieces. Each person ate 4 pieces. How many people were at the picnic?

Assign the seven questions in the exercises on page 287.

## Enrichment

Supply the following facts. Have the students make up their own questions, using these facts, to ask a partner to solve.

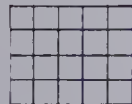
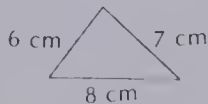
- 24 boys and 4 leaders attended summer camp
- nine children shared 36 pieces of candy
- John received \$10 on his birthday. The skateboard he wanted cost \$3.99, and the baseball glove cost \$5.49.

## Extra Practice

## Worksheet PS23-PS24

Pages 286-287

Choose **addition**, **subtraction**, **multiplication**, or **division**.  
Find the answer.

<p>1. What is the area in square centimetres? <i>5 cm</i> <i>multiplication</i> <i>20 cm<sup>2</sup></i></p> 	<p>2. 24 students ate lunch at 6 tables. <i>division</i> How many students ate at each table? <i>4</i></p>
<p>3. John received \$20 for his birthday. He bought a game for \$11.95. How much money was left? <i>subtraction</i> <i>\$8.05</i></p>	<p>4. Find the perimeter in centimetres. <i>addition</i> <i>21 cm</i></p> 

Objective N17

Introduce Roman numerals to 20.

Introducing the Lesson

Write the Roman numerals from 1 to 10 on the chalkboard. Ask students where they have seen these numbers before. Explain that these are special numbers developed long ago by people called the Romans. Therefore, they are called **Roman numerals**.

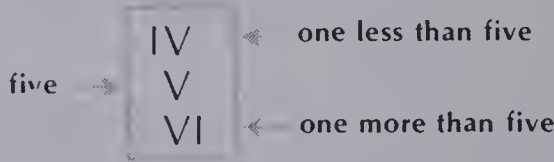
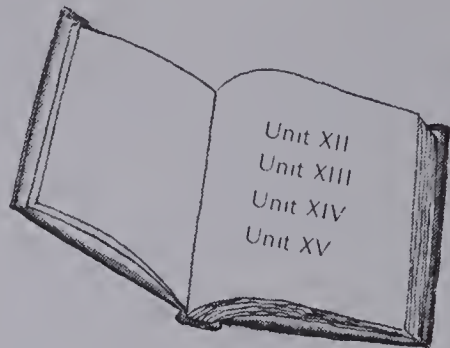
Teaching the Lesson

Explain, “This is how a Roman would write the numbers from 1 to 10. Can you guess what numbers they are?” Point out that only three different symbols are used, I, V, and X. Write our standard numbers 1, 5, and 10 beside the three Roman numeral symbols. With the help of the students, fill in the rest of the standard numbers. Ask, “How many different symbols do we use for the numbers from 1 to 10?” 10: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

Explain that since 4 is one less than 5, the Romans wrote 4 as “1 before 5”, or **IV**. For 6, which is one more than 5, they wrote “1 after 5”, or **VI**. Ask why 9 is written **IX**. *It is one less than ten.* “What will 11 be?” *It is one more than ten or XI*. Have students write the Roman numerals from 1 to 10 with the standard numerals beside them. Ask them to extend their list to 20. Discuss the way each Roman numeral from 11 to 20 is written. Note especially, 14 (**XIV** or “ten plus one less than five”) and 19 (**XIX** or “ten plus one less than ten”).

Roman Numerals

You may have seen **Roman numerals** on clocks or in books.



EXERCISES

Give the numeral in standard form.

- |          |          |           |           |            |
|----------|----------|-----------|-----------|------------|
| 1. III 3 | 2. V 5   | 3. X 10   | 4. IV 4   | 5. VI 6    |
| 6. IX 9  | 7. XI 11 | 8. VIII 8 | 9. XII 12 | 10. XII 12 |

Give the Roman numeral.

- |            |          |          |           |           |
|------------|----------|----------|-----------|-----------|
| 11. 2 II   | 12. 1 I  | 13. 5 V  | 14. 7 VII | 15. 10 X  |
| 16. 8 VIII | 17. 4 IV | 18. 9 IX | 19. 6 VI  | 20. 11 XI |

Using the Exercises

- Questions 1 to 10 convert Roman numerals to standard form. See that the students understand which numerals require addition and which require subtraction.
- Questions 11 to 20 convert standard numerals to Roman numerals. Stress that writing 4 and 9 as Roman numerals will require subtraction.



## PRACTICE

- Is VI one less or one more than V? *1 more*
- Is IX one less or one more than X? *1 less*
- Is XV five less or five more than X? *5 more*

Make a good guess.

- XV 105 or 15 or 10 or 5 *15*
- XVI 1051 or 151 or 16 or 14 *16*
- XIV 101 or 115 or 16 or 14 *14*
- XX 0 or 210 or 20 or 2 *20*
- XIX 111 or 19 or 1010 or 1 *19*

Copy and complete the equations.

- 7* VII + *1* I = ■ *VIII*
- 3* III + *4* IV = ■ *VII*

## REVIEW

- M19 Does it suggest **volume** or **area**?
- a box *volume*
  - a circle *area*
  - a ball *volume*
  - a triangle *area*

5. A centimetre cube is ■ wide, ■ long, and ■ tall.  
*1cm 1cm 1cm*

- M20 6.  ■ cubic centimetres  
*3*

N17 Give the numeral in standard form.

- V *5*
- X *10*
- VI *6*
- IX *9*

289

## Assigning the Practice

Minimum: 1-8

Average: 1-10

Enriched: 1-10

## Review Exercises

Questions	Objective	Pages
1-4	M19	282-283
5-6	M20	284-285
7-10	N17	288-289

## Reinforcement

Play "Roman Snap". Prepare 20 cards labelled with the numbers from 1 to 20 and another set of cards labelled with I to XX. This game is for two players and is played like "Snap". Each player shuffles his or her set of cards. The two players turn over their top cards simultaneously. If they match, the first player to call, "Roman Snap", wins the two cards. The winner is the player with the most cards at the end of the game.

## Enrichment

Copy and complete. Answer in Roman numerals.

- XX - XIV = \_\_\_\_
- VI + IV = \_\_\_\_
- V - I = \_\_\_\_
- II × III = \_\_\_\_
- XV - IX = \_\_\_\_
- IX × II = \_\_\_\_
- III + III = \_\_\_\_
- VI × III = \_\_\_\_
- XII + VIII = \_\_\_\_
- XIV ÷ VII = \_\_\_\_

## Extra Practice

## Worksheet N17

Pages 288-289

Write the numeral in standard form.

- XIII = *13*
- IX = *9*
- III = *3*
- VIII = *8*
- IV = *4*
- XI = *11*

Write the Roman numeral.

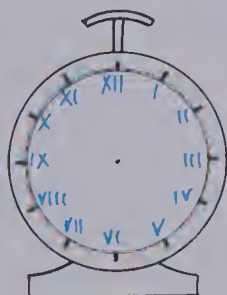
- 6 = *VI*
- 12 = *XII*
- 7 = *VII*
- 5 = *V*
- 4 = *IV*
- 9 = *IX*

Write Roman numerals for each chapter.

- 13.
- |                    |                     |
|--------------------|---------------------|
| Chapter <i>I</i>   | Chapter <i>VI</i>   |
| Chapter <i>II</i>  | Chapter <i>VII</i>  |
| Chapter <i>III</i> | Chapter <i>VIII</i> |
| Chapter <i>IV</i>  | Chapter <i>IX</i>   |
| Chapter <i>V</i>   | Chapter <i>X</i>    |

Write Roman numerals on the clock.

14.



## Objective A56

Multiply a one-digit number by 10 and 100.



## Introducing the Lesson

Have the students count aloud by tens to one hundred and by hundreds to one thousand. Repeat the counting pattern using the tens and hundreds blocks.

## Teaching the Lesson

Write the following on the chalkboard. Have the students illustrate each with rods or flats and then write the standard form of the numeral beside each.

4 tens  40      8 tens  80

6 hundreds  600      9 hundreds  900

Explain that another way to show this is by multiplying or thinking of equal groups of 10 or 100. Refer to the rods and flats as models for each multiplication.

Four groups of ten   $4 \times 10 = 40$       Eight groups of ten   $8 \times 10 = 80$

Six groups of one hundred   $6 \times 100 = 600$       Nine groups of one hundred   $9 \times 100 = 900$

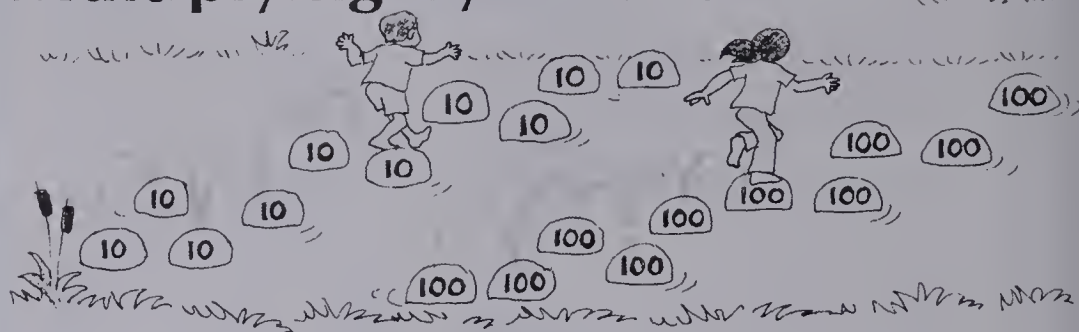
Ask for the standard form and the multiplication sentence for 1 ten and 10 tens. 10:  $1 \times 10 = 10$ , 100:  $10 \times 10 = 100$

Review the vertical form of writing multiplication. Emphasize reading from bottom to top.

$$\begin{array}{r} 10 \uparrow \\ \times 4 \end{array} \quad \begin{array}{r} 100 \uparrow \\ \times 6 \end{array} \quad \begin{array}{r} 10 \uparrow \\ \times 1 \end{array} \quad \begin{array}{r} 10 \uparrow \\ \times 10 \end{array}$$

Read and discuss the examples at the top of page 290.

# Multiplying by 10 and 100



Lonnie and Laurie are rock jumping.  
Lonnie counts by tens. Laurie counts by hundreds.  
How far has each counted?

$$6 \text{ tens} = 60$$

$$6 \times 10 = 60$$

$$6 \text{ hundreds} = 600$$

$$6 \times 100 = 600$$




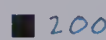


Lonnie has counted to 60.

Laurie has counted to 600.

## EXERCISES

- Count by tens to a hundred. *10, 20, 30, 40, 50, 60, 70, 80, 90, 100*
- Count by hundreds to a thousand. *100, 200, 300, 400, 500, 600, 700, 800, 900, 1000*

Copy and complete.

- 1 ten =  *10*
- 3 tens =  *30*
- 5 tens =  *50*
- $1 \times 10 = \text{■} \text{ } *10*$
- $3 \times 10 = \text{■} \text{ } *30*$
- $5 \times 10 = \text{■} \text{ } *50*$
- 2 hundreds =  *200*
- 4 hundreds =  *400*
- 6 hundreds =  *600*
- $2 \times 100 = \text{■} \text{ } *200*$
- $4 \times 100 = \text{■} \text{ } *400*$
- $6 \times 100 = \text{■} \text{ } *600*$

## Using the Exercises

- Questions 1 and 2 require counting by tens or hundreds.
- Questions 3 to 14 relate the number of tens and hundreds to the multiplication sentence represented.



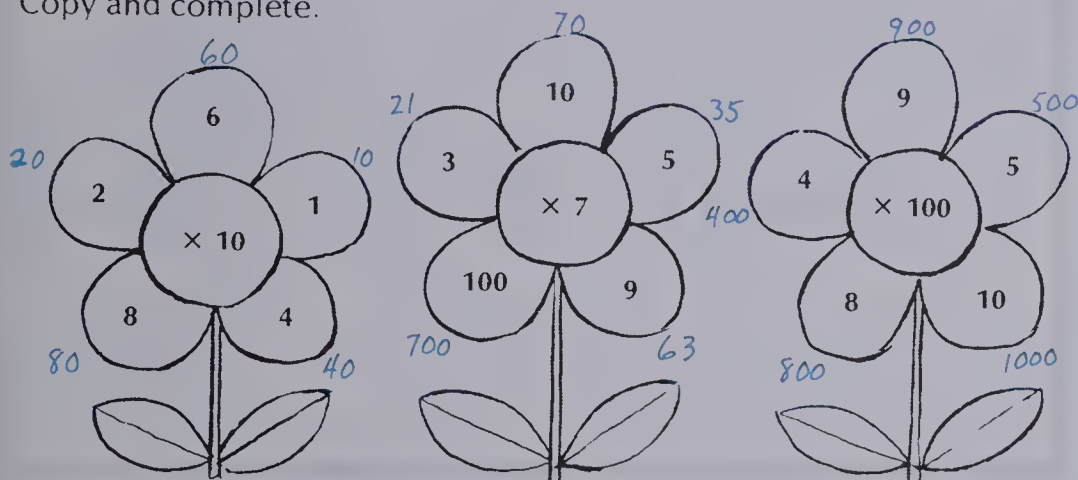
## PRACTICE

Multiply. Study the patterns.

1.  $2 \times 12$     2.  $7 \times 17$     3.  $4 \times 14$     4.  $10 \times 110$   
 $2 \times 10$  20     $7 \times 10$  70     $4 \times 10$  40     $10 \times 10$  100  
 $2 \times 100$  200     $7 \times 100$  700     $4 \times 100$  400     $10 \times 100$  1000
5.  $3 \times 10$  30    6.  $7 \times 10$  70    7.  $8 \times 10$  80    8.  $6 \times 10$  60
9.  $5 \times 100$  500    10.  $4 \times 100$  400    11.  $7 \times 100$  700    12.  $1 \times 100$  100
13.  $8 \times 100$  800    14.  $5 \times 10$  50    15.  $9 \times 10$  90    16.  $3 \times 100$  300
17.  $\begin{array}{r} 10 \\ \times 3 \\ \hline 30 \end{array}$     18.  $\begin{array}{r} 10 \\ \times 7 \\ \hline 70 \end{array}$     19.  $\begin{array}{r} 100 \\ \times 5 \\ \hline 500 \end{array}$     20.  $\begin{array}{r} 100 \\ \times 8 \\ \hline 800 \end{array}$

## Multiplication Flowers

Copy and complete.



291

## Assigning the Practice

Minimum: 1-20

Average: 1-20

Enriched: 1-20

## Reinforcement

1. Assign *Multiplication Flowers* at the bottom of page 291.

2. Ask the students to copy and complete the tables.

$\times$	10	$\times$	100	$\times$	9
3		2		0	
0		8		100	
1		10		1	
5		4		10	

## Enrichment

Have the students study these examples. Ask them to think of a pattern.

$3 \times 1 = 3$

$3 \text{ ones} = 3$

$3 \times 10 = 30$

$3 \text{ tens} = 30$

$3 \times 100 = 300$

$3 \text{ hundreds} = 300$

$3 \times 1000 = 3000$

$3 \text{ thousands} = 3000$

Tell them to use the pattern as they complete the following.

a.  $5 \times 1 = \underline{\quad}$

b.  $1 \times 1 = \underline{\quad}$

$5 \times 10 = \underline{\quad}$

$1 \times 10 = \underline{\quad}$

$5 \times 100 = \underline{\quad}$

$1 \times 100 = \underline{\quad}$

$5 \times 1000 = \underline{\quad}$

$1 \times 1000 = \underline{\quad}$

c.  $8 \times 1 = \underline{\quad}$

d.  $9 \text{ ones} = \underline{\quad}$

$8 \times 10 = \underline{\quad}$

$9 \text{ tens} = \underline{\quad}$

$8 \times 100 = \underline{\quad}$

$9 \text{ hundreds} = \underline{\quad}$

$8 \times 1000 = \underline{\quad}$

$9 \text{ thousands} = \underline{\quad}$

e.  $10 \text{ ones} = \underline{\quad}$

f.  $10 \times 1 = \underline{\quad}$

$10 \text{ tens} = \underline{\quad}$

$10 \times 10 = \underline{\quad}$

$10 \text{ hundreds} = \underline{\quad}$

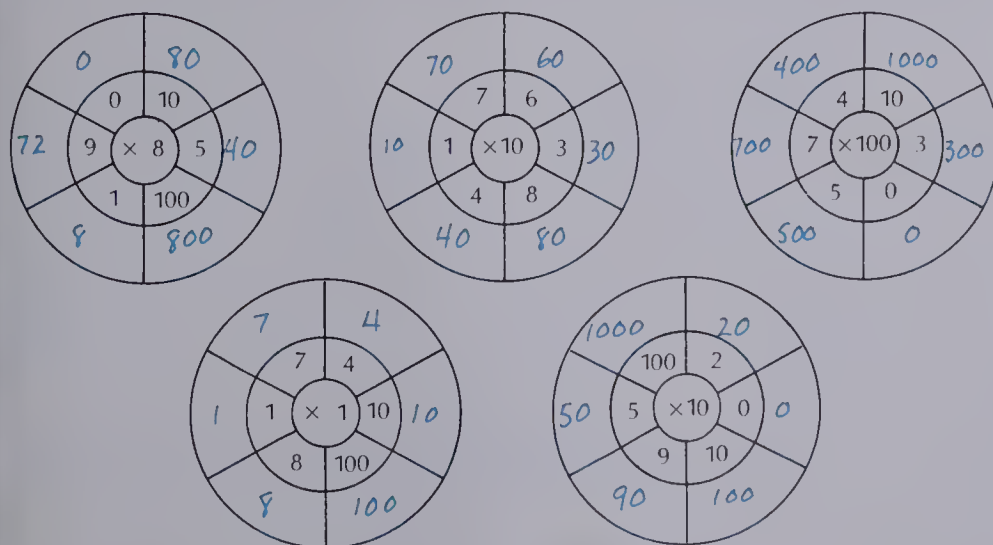
$10 \times 100 = \underline{\quad}$

$10 \text{ thousands} = \underline{\quad}$

$10 \times 1000 = \underline{\quad}$

## Extra Practice

Multiply.



## Worksheet A56

Pages 290-291

## Objective A57

Multiply a one-digit number by a multiple of 10.

## Introducing the Lesson

Review the standard form for:

2 tens 20      4 tens 40

7 tens 70      9 tens 90

Explain that these numbers are called *multiples of ten*. Ask, "What are some other multiples of 10?"

## Teaching the Lesson

Write sets of exercises such as the following on the chalkboard.

$3 \times 2 = \underline{\quad}$	$5 \times 3 = \underline{\quad}$
↓	↓
$3 \times 2 \text{ tens} = \underline{\quad} \text{ tens}$	$5 \times 3 \text{ tens} = \underline{\quad} \text{ tens}$
↓	↓
$3 \times 20 = \underline{\quad}$	$5 \times 30 = \underline{\quad}$

Have the students use the number blocks to model  $3 \times 2$  and  $3 \times 2$  tens to check their answers. Explain that  $3 \times 2$  means 3 groups of 2. Repeat for the other example,  $5 \times 3$ .

Discuss the pattern of multiplying the digits, e.g.,  $3 \times 2$  or  $5 \times 3$  and adding on a zero to the right to make a multiple of ten.

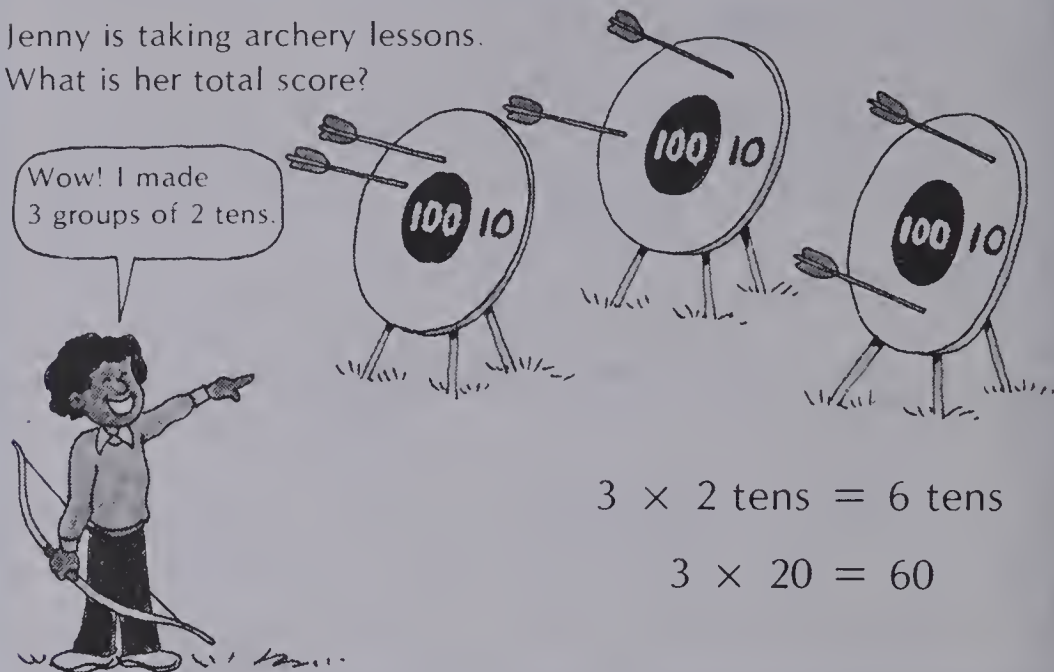
Review the vertical form for writing multiplication.

$\begin{array}{r} 2 \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 2 \text{ tens} \\ \times 3 \\ \hline \end{array}$	$\begin{array}{r} 20 \\ \times 3 \\ \hline \end{array}$
_____	_____ tens	_____

Direct the students to page 292. Read and discuss the archery example given.

# Multiplying by Tens

Jenny is taking archery lessons. What is her total score?



$$3 \times 2 \text{ tens} = 6 \text{ tens}$$

$$3 \times 20 = 60$$

Jenny scored 60 in all.

## EXERCISES

Copy and complete.

- |  |  |
|--|--|
| 1. $6 \times 2 \text{ tens} = \blacksquare \text{ tens}$<br>$6 \times 20 = \blacksquare 120$ | 2. $3 \times 3 \text{ tens} = \blacksquare \text{ tens}$<br>$3 \times 30 = \blacksquare 90$  |
| 3. $5 \times 3 \text{ tens} = \blacksquare \text{ tens}$<br>$5 \times 30 = \blacksquare 150$ | 4. $4 \times 6 \text{ tens} = \blacksquare \text{ tens}$<br>$4 \times 60 = \blacksquare 240$ |
| 5. $1 \text{ ten} \times 7 = \blacksquare \text{ tens}$<br>$10 \times 7 = \blacksquare 70$   | 6. $5 \text{ tens} \times 9 = \blacksquare \text{ tens}$<br>$50 \times 9 = \blacksquare 450$ |
| 7. $4 \times 50 = \blacksquare 200$  | 8. $50 \times 6 = \blacksquare 300$  |

## Using the Exercises

- Questions 1 to 8 relate to two ways of multiplying a one-digit number by a multiple of 10. This step, which was developed during the lesson, should make two-digit multiplication more understandable.

$$\begin{array}{l} 6 \times 2 \text{ tens} = 12 \text{ tens} \\ 6 \times 20 = 120 \end{array}$$



## PRACTICE

Multiply. Study the pattern.

1.  $4 \times 2$  8    2.  $2 \times 3$  6    3.  $3 \times 6$  18    4.  $6 \times 9$  54  
 $4 \times 20$  80     $2 \times 30$  60     $3 \times 60$  180     $6 \times 90$  540

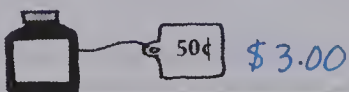
5.  $4 \times 70$  280    6.  $5 \times 40$  200    7.  $8 \times 50$  400    8.  $7 \times 70$  490

9.  $\begin{array}{r} 30 \\ \times 7 \\ \hline 210 \end{array}$     10.  $\begin{array}{r} 80 \\ \times 6 \\ \hline 480 \end{array}$     11.  $\begin{array}{r} 70 \\ \times 8 \\ \hline 560 \end{array}$     12.  $\begin{array}{r} 50 \\ \times 8 \\ \hline 400 \end{array}$

Solve.

13. How much for 3 balls?

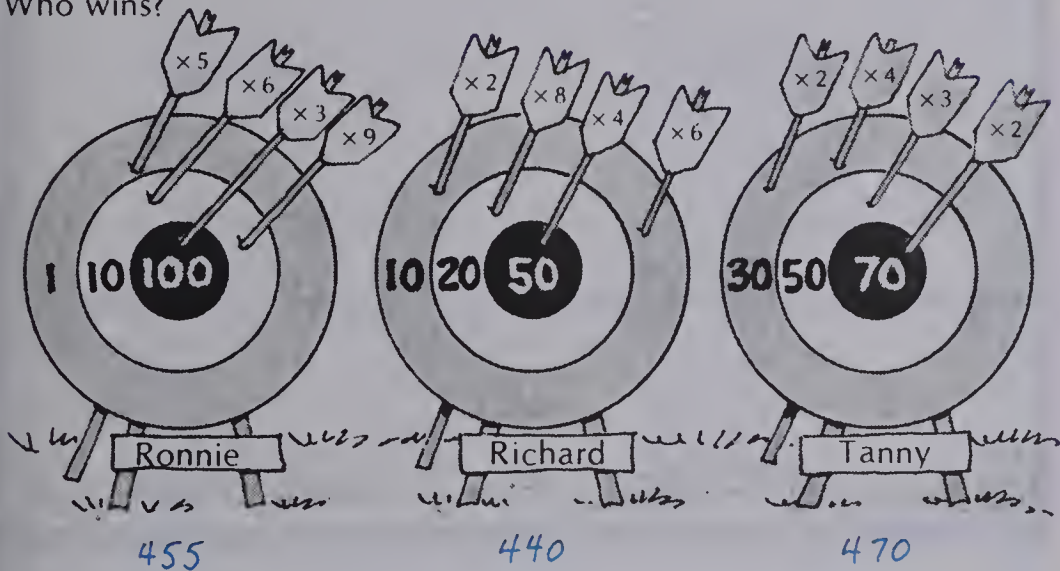
14. How much for 6 bottles?



## Archery Aces

Find the value of each arrow. Add the values for each target.

Who wins?



Tanny wins.

293

## Assigning the Practice

Minimum: 1-14

Average: 1-14

Enriched: 1-14

## Reinforcement

1. Assign Archery Aces at the bottom of page 293. Make similar targets from cardboard, and use bean bags as "arrows". Use these to play a game for 2, 3, or 4 players.

2. Copy and complete the tables.

a.

$\times$	80
6	
8	
5	
1	

b.

$\times$	5
10	
20	
30	
40	

c.

$\times$	60
8	
4	
7	
3	

d.

$\times$	9
30	
10	
50	
70	

## Enrichment

1. Tell the students to study this example. Think of a pattern.

$2 \times 3 = 6$

$2 \times 30 = 60$

$2 \times 300 = 600$

Have them use the pattern to complete the following.

a.  $2 \times 4 = \underline{\quad}$

b.  $6 \times 2 = \underline{\quad}$

$2 \times 40 = \underline{\quad}$

$6 \times 20 = \underline{\quad}$

$2 \times 400 = \underline{\quad}$

$6 \times 200 = \underline{\quad}$

c.  $8 \times 5 = \underline{\quad}$

d.  $9 \times 7 = \underline{\quad}$

$8 \times 50 = \underline{\quad}$

$9 \times 70 = \underline{\quad}$

$8 \times 500 = \underline{\quad}$

$9 \times 700 = \underline{\quad}$

2. Ask the students "Which is more? Hint: Change the hours to minutes."

a. 2 hours or 75 minutes

b. 200 minutes or 3 hours

c. 4 hours or 250 minutes

## Extra Practice

## Worksheet A57

Pages 292-293

Multiply.

1.  $4 \times 3$  tens = 12 tens    2.  $7 \times 5$  tens = 35 tens  
 3.  $9 \times 2$  tens = 18 tens    4.  $5 \times 6$  tens = 30 tens  
 5.  $4 \times 90 =$  360    6.  $8 \times 20 =$  160    7.  $5 \times 40 =$  200    8.  $2 \times 60 =$  120

9.  $\begin{array}{r} 40 \\ \times 7 \\ \hline 280 \end{array}$     10.  $\begin{array}{r} 80 \\ \times 3 \\ \hline 240 \end{array}$     11.  $\begin{array}{r} 60 \\ \times 6 \\ \hline 360 \end{array}$     12.  $\begin{array}{r} 70 \\ \times 9 \\ \hline 630 \end{array}$

Solve.

3. A building has 8 apartments on each floor. There are 20 floors. How many apartments in all are in the building? 160

Objective A58

Multiply a one-digit number by a two-digit number, without regrouping.

Introducing the Lesson

Have a three-minute oral drill of the multiplication facts to 9 including 10 and multiples of 10 as factors.  
2 × 4, 3 × 3, 1 × 5, 2 × 3  
3 × 1 ten, 4 × 2 tens, 3 × 3 tens, 2 × 2 tens

Teaching the Lesson

Read the problem at the top of page 294. Explain that the answer can be found by adding 12 three times or by multiplying 3 times 12. Show each method on the chalkboard.

tens	ones
1	2
1	2
+1	2

Add the ones first.  
Add the tens next.

tens	ones
1	2
×	3

Multiply 3 × 2 ones first.  
Multiply 3 × 1 tens next.

Check the answer by modelling with the number blocks. It may be necessary to use a visual cue like an arrow to help the students remember to multiply the ones, then the tens.

Repeat the above sequence with other addition problems.

a. 3 packages of 23 paper plates. How many plates in all?

b. 2 bags of cookies. 42 cookies per bag. How many cookies in all?

Two-Place Multiplication

Picnic List

3 packages of hot dogs  
12 hot dogs in each package  
How many hot dogs in all?

Add. or Multiply.

12  
12  
+ 12  
36

12  
× 3  
?

Multiply the ones.      Multiply the tens.

tens	ones
1	2
×	3
	6

tens	ones
1	2
×	3
3	6

There are 36 hot dogs in all.

EXERCISES

Add and multiply.

1. 

21	21
+ 21	×
63	63

2. 

13	13
+ 13	×
39	39

3. 

32	32
+ 32	×
64	64

4. 

43	43
+ 43	×
86	86

5. 

11	11
+ 11	×
44	44

6. 

21	21
+ 21	×
84	84

Using the Exercises

- Each of the six questions develops two-digit multiplication by picturing the base 10 number blocks and giving the addition and multiplication forms of the problems illustrated.



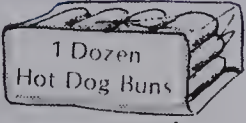
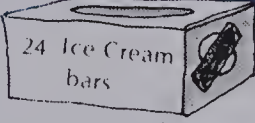
# PRACTICE



Multiply.

1. $\begin{array}{r} \text{tens} \quad \text{ones} \\ 2 \quad 3 \\ \times \quad 2 \\ \hline 4 \quad 6 \end{array}$	2. $\begin{array}{r} \text{tens} \quad \text{ones} \\ 3 \quad 1 \\ \times \quad 3 \\ \hline 9 \quad 3 \end{array}$	3. $\begin{array}{r} \text{tens} \quad \text{ones} \\ 1 \quad 1 \\ \times \quad 7 \\ \hline 7 \quad 7 \end{array}$	4. $\begin{array}{r} \text{tens} \quad \text{ones} \\ 3 \quad 2 \\ \times \quad 4 \\ \hline 12 \quad 8 \end{array}$
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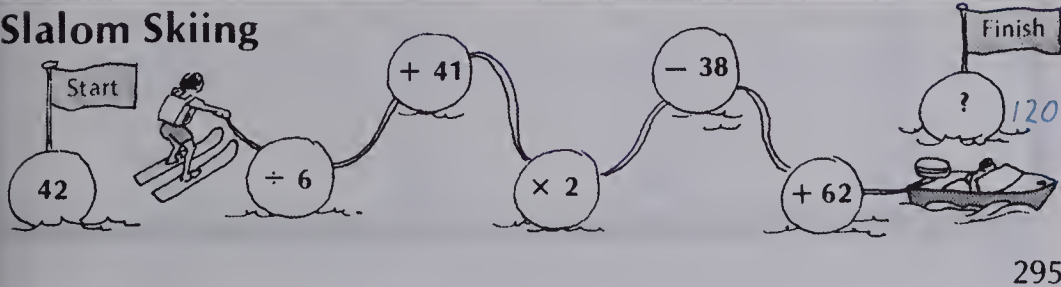
5. $\begin{array}{r} \text{tens} \quad \text{ones} \\ 4 \quad 3 \\ \times \quad 2 \\ \hline 8 \quad 6 \end{array}$	6. $\begin{array}{r} \text{tens} \quad \text{ones} \\ 1 \quad 2 \\ \times \quad 4 \\ \hline 4 \quad 8 \end{array}$	7. $\begin{array}{r} \text{tens} \quad \text{ones} \\ 3 \quad 2 \\ \times \quad 3 \\ \hline 9 \quad 6 \end{array}$	8. $\begin{array}{r} \text{tens} \quad \text{ones} \\ 1 \quad 1 \\ \times \quad 5 \\ \hline 5 \quad 5 \end{array}$
--	--	--	--

9. $\begin{array}{r} 44 \\ \times 2 \\ \hline 88 \end{array}$	10. $\begin{array}{r} 21 \\ \times 2 \\ \hline 42 \end{array}$	11. $\begin{array}{r} 13 \\ \times 2 \\ \hline 26 \end{array}$	12. $\begin{array}{r} 32 \\ \times 3 \\ \hline 96 \end{array}$
---	--	--	--

13.  <span style="margin-left: 100px;">48</span> How many buns in 4 dozen?	14.  <span style="margin-left: 100px;">48</span> How many bars in 2 boxes?
--	--

15.  <span style="margin-left: 100px;">63</span> How many cookies in 3 packages?	16.  <span style="margin-left: 100px;">128</span> How many plates in 4 packages?
---	---

## Slalom Skiing



295

## Assigning the Practice

Minimum: 1-12

Average: 1-16

Enriched: 1-16

## Reinforcement

Conduct a race to solve questions 9 to 12 on page 295.

Player 1 uses blocks only.

Player 2 uses addition.

Player 3 uses multiplication.

The winner is the first player to write the answers on the chalkboard.

## Enrichment

1. Assign *Slalom Skiing* at the bottom of page 295.

2. Ask the students to find the keys to unlock these problems.

a.  $\begin{array}{r} 3 \text{ } \Omega \\ \times 2 \\ \hline 60 \end{array}$

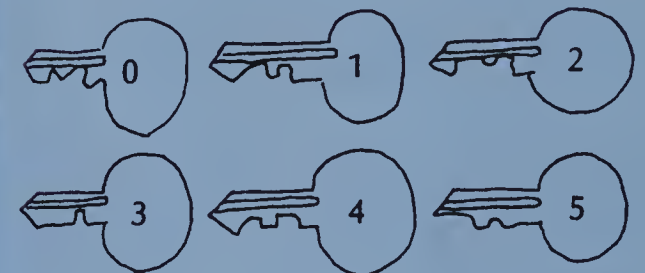
b.  $\begin{array}{r} 2 \text{ } \Omega \\ \times 2 \\ \hline 42 \end{array}$

c.  $\begin{array}{r} \text{ } \Omega 4 \\ \times 2 \\ \hline 88 \end{array}$

d.  $\begin{array}{r} \text{ } \Omega 3 \\ \times 2 \\ \hline 46 \end{array}$

e.  $\begin{array}{r} 31 \\ \times \text{ } \Omega \\ \hline 93 \end{array}$

f.  $\begin{array}{r} 11 \\ \times \text{ } \Omega \\ \hline 55 \end{array}$

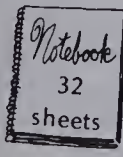

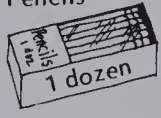

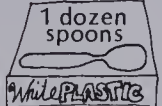


## Extra Practice

## Worksheet A58

Pages 294-295

Multiply. Solve.

 How many sheets in 3 notebooks? <span style="margin-left: 20px;">96</span>	 How many envelopes in 4 boxes? <span style="margin-left: 20px;">88</span>	 How many pencils in 3 dozen? <span style="margin-left: 20px;">36</span>
14 boxes of raisins in 1 bag How many boxes in 2 bags? <span style="margin-left: 20px;">28</span>	31 pages  How many pages in 3 books? <span style="margin-left: 20px;">93</span>	1 dozen spoons  How many spoons in 4 packages? <span style="margin-left: 20px;">48</span>

Objective A59

Multiply a one-digit number by a two-digit number, regrouping the ones.

Introducing the Lesson

Review the trading of ones for tens and ones using number blocks. Include both oral and written practice.  
16 ones = 1 ten and 6 ones  
24 ones = 2 tens and 4 ones  
Have a three-minute oral drill of the multiplication facts to 81.

Teaching the Lesson

Read the problem at the top of page 296. Explain that the answer can be found by adding 24 three times or by multiplying 3 times 24. Show each method on the chalkboard.

tens	ones
2	4
2	4
+2	4

Add the ones first.  
Regroup 12 ones as 1 ten, 2 ones.  
Add the tens next.  
Don't forget the 1 ten.

ten	ones
2	4
×	3

Multiply 3 × 4 ones.  
Regroup 12 ones as 1 ten, 2 ones.  
Multiply 3 × 2 tens.  
Don't forget to add the 1 ten.

Point out the placement of the 1 ten in the tens column. Check the answers by modelling with number blocks.

Repeat the above sequence with extra problems.

a. 4 packages of wieners. 18 wieners in a package. How many wieners in all?

b. 36 buns to a package. 3 packages. How many buns in all?

Two-Place Multiplication

**Picnic List**

3 cases of juice  
24 cans in each case  
How many cans of juice in all?

Add. or Multiply.

$$\begin{array}{r} 24 \\ 24 \\ + 24 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 24 \\ \times 3 \\ \hline ? \end{array}$$

Multiply the ones.  
Regroup 12 ones as 1 ten 2 ones.

Multiply the tens.  
Add 6 tens and 1 ten.

tens	ones
1	
2	4
×	3
	2

tens	ones
1	
2	4
×	3
7	2

There are 72 cans of juice in all.

**EXERCISES**

Add and multiply.

1.  $\begin{array}{r} 17 \\ 17 \\ + 17 \\ \hline 51 \end{array}$

5.  $\begin{array}{r} 14 \\ 14 \\ 14 \\ + 14 \\ \hline 56 \end{array}$

2.  $\begin{array}{r} 17 \\ \times 3 \\ \hline 51 \end{array}$

6.  $\begin{array}{r} 14 \\ \times 4 \\ \hline 56 \end{array}$

3.  $\begin{array}{r} 25 \\ 25 \\ + 25 \\ \hline 75 \end{array}$

7.  $\begin{array}{r} 18 \\ 18 \\ 18 \\ + 18 \\ \hline 72 \end{array}$

4.  $\begin{array}{r} 25 \\ \times 3 \\ \hline 75 \end{array}$

8.  $\begin{array}{r} 3 \\ 18 \\ \times 4 \\ \hline 72 \end{array}$

Using the Exercises

- The eight questions are paired so that the first example of the pair is a repeated addition and the second is the related multiplication. For each pair the ones need to be regrouped as tens and ones.
- Note: If students are not ready to multiply without the aid of place-value charts, allow them to use them on their work.

tens	ones
1	7
×	3



## PRACTICE

Multiply.

- |  |  |  |  |
|--|--|--|--|
| 1. $\begin{array}{r l} \text{tens} & \text{ones} \\ 1 & 5 \\ \times & 5 \\ \hline 7 & 5 \end{array}$ | 2. $\begin{array}{r l} \text{tens} & \text{ones} \\ 1 & 6 \\ \times & 6 \\ \hline 9 & 6 \end{array}$ | 3. $\begin{array}{r l} \text{tens} & \text{ones} \\ 1 & 7 \\ \times & 4 \\ \hline 6 & 8 \end{array}$ | 4. $\begin{array}{r l} \text{tens} & \text{ones} \\ 2 & 8 \\ \times & 3 \\ \hline 8 & 4 \end{array}$ |
| 5. $\begin{array}{r} 24 \\ \times 4 \\ \hline 96 \end{array}$  | 6. $\begin{array}{r} 29 \\ \times 3 \\ \hline 87 \end{array}$  | 7. $\begin{array}{r} 18 \\ \times 3 \\ \hline 54 \end{array}$  | 8. $\begin{array}{r} 19 \\ \times 4 \\ \hline 76 \end{array}$  |
| 9. $\begin{array}{r} 26 \\ \times 3 \\ \hline 78 \end{array}$  | 10. $\begin{array}{r} 25 \\ \times 3 \\ \hline 75 \end{array}$                                       | 11. $\begin{array}{r} 38 \\ \times 2 \\ \hline 76 \end{array}$                                       | 12. $\begin{array}{r} 46 \\ \times 2 \\ \hline 92 \end{array}$                                       |

How many eggs?

13. 1 dozen 12    14. 3 dozen 36    15. 5 dozen 60    16. 6 dozen 72

## REVIEW

Multiply.

- |     |  |  |   |   |
|-----|--|--|---|---|
| A56 | 1. $\begin{array}{r} 10 \\ \times 6 \\ \hline 60 \end{array}$  | 2. $\begin{array}{r} 10 \\ \times 8 \\ \hline 80 \end{array}$  | 3. $\begin{array}{r} 100 \\ \times 7 \\ \hline 700 \end{array}$ | 4. $\begin{array}{r} 100 \\ \times 5 \\ \hline 500 \end{array}$ |
| A57 | 5. $\begin{array}{r} 80 \\ \times 2 \\ \hline 160 \end{array}$ | 6. $\begin{array}{r} 40 \\ \times 6 \\ \hline 240 \end{array}$ | 7. $\begin{array}{r} 60 \\ \times 7 \\ \hline 420 \end{array}$  | 8. $\begin{array}{r} 80 \\ \times 9 \\ \hline 720 \end{array}$  |
| A58 | 9. $\begin{array}{r} 42 \\ \times 2 \\ \hline 84 \end{array}$  | 10. $\begin{array}{r} 34 \\ \times 2 \\ \hline 68 \end{array}$ | 11. $\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$  | 12. $\begin{array}{r} 12 \\ \times 4 \\ \hline 48 \end{array}$  |
| A59 | 13. $\begin{array}{r} 19 \\ \times 5 \\ \hline 95 \end{array}$ | 14. $\begin{array}{r} 37 \\ \times 2 \\ \hline 74 \end{array}$ | 15. $\begin{array}{r} 26 \\ \times 3 \\ \hline 78 \end{array}$  | 16. $\begin{array}{r} 23 \\ \times 4 \\ \hline 92 \end{array}$  |

297

## Assigning the Practice

Minimum: 1-12

Average: 1-16

Enriched: 1-16

## Review Exercises

Questions	Objective	Pages
1-4	A56	290-291
5-8	A57	292-293
9-12	A58	294-295
13-16	A59	296-297

## Reinforcement

Have the students circle and solve the multiplications that require regrouping.

- |  |  |  |
|--|--|--|
| a. $\begin{array}{r} 26 \\ \times 4 \\ \hline \end{array}$ | b. $\begin{array}{r} 32 \\ \times 4 \\ \hline \end{array}$ | c. $\begin{array}{r} 12 \\ \times 6 \\ \hline \end{array}$ |
| d. $\begin{array}{r} 24 \\ \times 3 \\ \hline \end{array}$ | e. $\begin{array}{r} 11 \\ \times 9 \\ \hline \end{array}$ | f. $\begin{array}{r} 41 \\ \times 2 \\ \hline \end{array}$ |

## Enrichment

Ask the students to find the missing numbers.

- |  |  |  |
|--|--|--|
| a. $\begin{array}{r} 2 \\ 1\Box \\ \times 4 \\ \hline 60 \end{array}$  | b. $\begin{array}{r} 1 \\ 3\Box \\ \times 2 \\ \hline 78 \end{array}$  | c. $\begin{array}{r} 2 \\ 2\Box \\ \times 3 \\ \hline 81 \end{array}$  |
| d. $\begin{array}{r} 1 \\ \Box 5 \\ \times 2 \\ \hline 50 \end{array}$ | e. $\begin{array}{r} 2 \\ \Box 9 \\ \times 3 \\ \hline 87 \end{array}$ | f. $\begin{array}{r} 3 \\ \Box 7 \\ \times 5 \\ \hline 85 \end{array}$ |

## Extra Practice

## Worksheet A59

Pages 296-297

Multiply. Solve.



How much for 4 cars?  
236¢



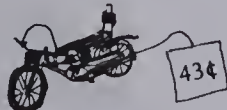
How much for 3 buses?  
255¢



How much for 8 pick-up trucks?  
592¢



How much for 6 vans?  
408¢



How much for 5 motorcycles?  
215¢



How much for 2 moving vans?  
198¢

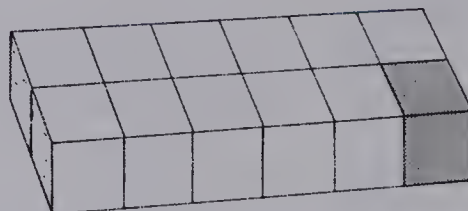
Unit 15 Objectives	Test Questions	Pages
M19	1-4	282-283
M20	5	284-285
N17	6	288-289
A56	7-10	290-291
A57	11-14	292-293
A58	15-18	294-295
A59	19-22	296-297
PS	23-24	

# TEST

# UNIT 15

Does it suggest **volume** or **area**?

1. an eraser *volume*
2. a stamp *area*
3. a picture *area*
4. a cube *volume*
5. What is the volume?



one cubic centimetre  
 $12 \text{ cm}^3$

6. What is the Roman numeral X in standard form? *10*

Multiply.

7.  $8 \times 10$  *80*
8.  $7 \times 100$  *700*
9.  $10 \times 5$  *50*
10.  $100 \times 2$  *200*
11.  $3 \times 60$  *180*
12.  $20 \times 8$  *160*
13.  $9 \times 70$  *630*
14.  $60 \times 7$  *420*

15. 
$$\begin{array}{r} 23 \\ \times 2 \\ \hline 46 \end{array}$$
16. 
$$\begin{array}{r} 41 \\ \times 2 \\ \hline 82 \end{array}$$
17. 
$$\begin{array}{r} 12 \\ \times 3 \\ \hline 36 \end{array}$$
18. 
$$\begin{array}{r} 32 \\ \times 3 \\ \hline 96 \end{array}$$
19. 
$$\begin{array}{r} 18 \\ \times 6 \\ \hline 108 \end{array}$$
20. 
$$\begin{array}{r} 39 \\ \times 2 \\ \hline 78 \end{array}$$
21. 
$$\begin{array}{r} 27 \\ \times 3 \\ \hline 81 \end{array}$$
22. 
$$\begin{array}{r} 16 \\ \times 5 \\ \hline 80 \end{array}$$

Solve.

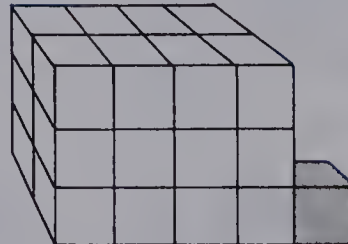
23. 4 rolls *76*  
19 zoo tickets on each  
How many tickets in all?
24. 6 cages *138*  
23 monkeys in each  
How many monkeys in all?

## Post-test

## Unit 15

Does it suggest **volume** or **area**?

1. a basket *volume*
2. a desk top *area*
3. a chalkboard *area*
4. a lunch box *volume*
5. What is the volume?



one cubic centimetre  
 $25 \text{ cm}^3$

6. What is the Roman numeral IV in standard form? *4*

Multiply.

7.  $4 \times 10 =$  *40*
8.  $8 \times 100 =$  *800*
9.  $10 \times 2 =$  *20*
10.  $100 \times 5 =$  *500*





## DECIMALS

Write the fraction.

1.   $\frac{1}{3}$
2.   $\frac{3}{4}$
3.   $\frac{7}{12}$

Write as a decimal.

4.  $\frac{1}{10}$   $0.1$
5.  $\frac{3}{10}$   $0.3$
6.   $0.7$
7. 2 tenths  $0.2$
8. 10 tenths  $1.0$
9.   $1.3$

Which is greater?

10.  $\frac{1}{4}$  or  $\frac{3}{4}$
11.  $\frac{2}{3}$  or  $\frac{1}{3}$
12.  $\frac{4}{10}$  or  $\frac{5}{10}$
13.  $\frac{1}{4}$  or  $\frac{3}{4}$
14.  $0.3$  or  $0.2$
15.  $1.3$  or  $2.0$
16.  $1.4$  or  $1.2$

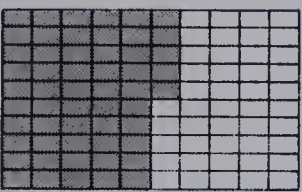
Add.

17.  $0.3$   
 $+ 0.4$   
 $\hline 0.7$
18.  $0.7$   
 $+ 0.6$   
 $\hline 1.3$

Subtract.

19.  $0.9$   
 $- 0.3$   
 $\hline 0.6$
20.  $1.6$   
 $- 0.9$   
 $\hline 0.7$

Write as a decimal.

21.   $0.55$
22. 31 hundredths  $0.31$
23. 6 hundredths  $0.06$
24. 3 m and 24 cm  $3.24$  m

11.  $9 \times 70 = 630$  12.  $8 \times 20 = 160$  13.  $3 \times 60 = 180$  14.  $8 \times 50 = 400$

15.  $\begin{array}{r} 24 \\ \times 2 \\ \hline 48 \end{array}$  16.  $\begin{array}{r} 13 \\ \times 3 \\ \hline 39 \end{array}$  17.  $\begin{array}{r} 11 \\ \times 8 \\ \hline 88 \end{array}$  18.  $\begin{array}{r} 14 \\ \times 2 \\ \hline 28 \end{array}$




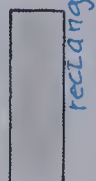

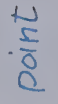

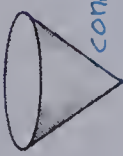
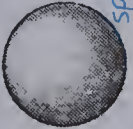

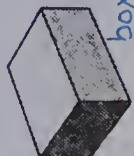
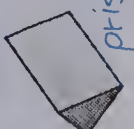
19.  $\begin{array}{r} 25 \\ \times 7 \\ \hline 175 \end{array}$  20.  $\begin{array}{r} 36 \\ \times 4 \\ \hline 144 \end{array}$  21.  $\begin{array}{r} 48 \\ \times 9 \\ \hline 432 \end{array}$  22.  $\begin{array}{r} 57 \\ \times 6 \\ \hline 342 \end{array}$

Solve.

23. 3 buses.  $105$   
35 students on each.  
How many students in all?
24. 4 aquariums.  $72$   
18 fish in each.  
How many fish in all?

# GEOMETRY



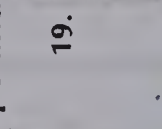
Pick the best name from the list.

1.  triangle
2.  square
3.  circle
4.  rectangle
5.  point
6.  segment
7.  cube
8.  cone
9.  sphere
10.  cylinder
11.  box
12.  prism

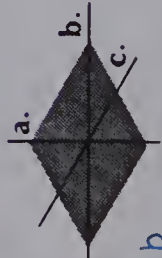
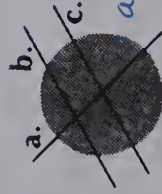

box  
circle  
cone  
cube  
cylinder  
point  
prism  
rectangle  
segment  
sphere  
square  
triangle

13. Which have no corners? sphere, point, circle, cylinder
14. Which solid has 2 edges? cylinder
15. Which two solids have 8 corners each? cube, box
16. Which solid has 5 faces? prism

Write different, same shape, or same shape and size.

17.  same shape
18.  same shape and size
19.  different

Which are lines of symmetry?

20.  a, b
21.  a, c
22.  a

# MEASUREMENT

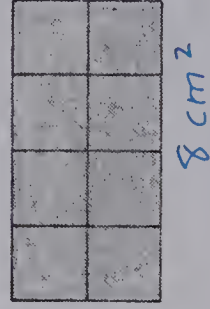
Find the length or perimeter in centimetres.

1.  6 cm
2.  7 cm, 16 cm, 2 cm

Complete each equation.

3. 1 m =  cm
4. 1 km =  m
5. 1 kg =  g
6. 105 cm =  m
7. 3 m and 24 cm =  m

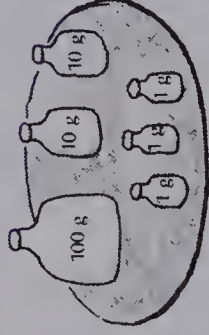

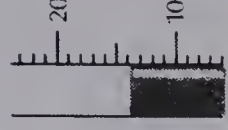
8. How many square centimetres?



9. How many cubic centimetres?



Complete each measurement.

10.  grams
11.  5:45
12.  14°C



# Cumulative Test

## UNITS 1-5

Add.

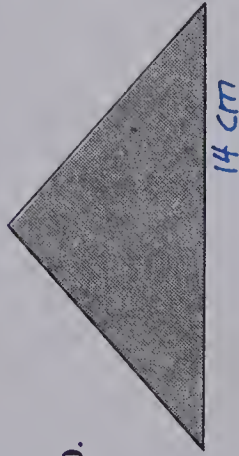
$$\begin{array}{r} 1. \quad 7 \\ +4 \\ \hline 11 \end{array} \quad \begin{array}{r} 2. \quad 3 \\ +9 \\ \hline 12 \end{array} \quad \begin{array}{r} 3. \quad 7 \\ +5 \\ \hline 12 \end{array} \quad \begin{array}{r} 4. \quad 2 \\ +8 \\ \hline 10 \end{array} \quad \begin{array}{r} 5. \quad 8 \\ +8 \\ \hline 16 \end{array}$$

$$6. \quad 30 + 2 \quad 32 \quad 7. \quad 40 + 9 \quad 49 \quad 8. \quad 8 + 20 \quad 28$$

Find the perimeters.



9.



10.

Subtract.

$$\begin{array}{r} 11. \quad 10 \\ -3 \\ \hline 7 \end{array} \quad \begin{array}{r} 12. \quad 16 \\ -8 \\ \hline 8 \end{array} \quad \begin{array}{r} 13. \quad 14 \\ -9 \\ \hline 5 \end{array} \quad \begin{array}{r} 14. \quad 13 \\ -5 \\ \hline 8 \end{array} \quad \begin{array}{r} 15. \quad 12 \\ -4 \\ \hline 8 \end{array}$$

Complete the equation.

$$16. \quad 1 \text{ m} = \boxed{100} \text{ cm} \quad 17. \quad 3 \text{ m} = \boxed{300} \text{ cm} \quad 18. \quad 2 \text{ km} = \boxed{2000} \text{ m}$$

Write in standard form.

$$19. \quad 200 + 40 + 3 \quad 243 \quad 20. \quad 400 + 20 + 8 \quad 428 \quad 21. \quad 300 + 5 \quad 305$$

$$22. \quad \text{two hundred six} \quad 206 \quad 23. \quad \text{three hundred eighty} \quad 380$$

$$24. \quad \text{Count from 195 to 205 by ones.}$$

$$25. \quad \text{Count from 360 to 440 by tens.}$$

Use < or >.

$$26. \quad 260 \quad 195 \quad 27. \quad 764 \quad 778 \quad 28. \quad 461 \quad 468$$

Add.

$$\begin{array}{r} 29. \quad 24 \\ +35 \\ \hline 59 \end{array} \quad \begin{array}{r} 30. \quad 60 \\ +7 \\ \hline 67 \end{array} \quad \begin{array}{r} 31. \quad 58 \\ +4 \\ \hline 62 \end{array} \quad \begin{array}{r} 32. \quad 67 \\ +17 \\ \hline 84 \end{array}$$

$$\begin{array}{r} 33. \quad 25 \\ +46 \\ \hline 71 \end{array} \quad \begin{array}{r} 34. \quad 32 \\ +70 \\ \hline 102 \end{array} \quad \begin{array}{r} 35. \quad 38 \\ +65 \\ \hline 103 \end{array} \quad \begin{array}{r} 36. \quad 76 \\ +67 \\ \hline 143 \end{array}$$

Subtract.

$$\begin{array}{r} 37. \quad 60 \\ -30 \\ \hline 30 \end{array} \quad \begin{array}{r} 38. \quad 75 \\ -34 \\ \hline 41 \end{array} \quad \begin{array}{r} 39. \quad 63 \\ -19 \\ \hline 44 \end{array} \quad \begin{array}{r} 40. \quad 72 \\ -36 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 41. \quad 84 \\ -77 \\ \hline 7 \end{array} \quad \begin{array}{r} 42. \quad 134 \\ -47 \\ \hline 87 \end{array} \quad \begin{array}{r} 43. \quad 122 \\ -44 \\ \hline 78 \end{array} \quad \begin{array}{r} 44. \quad 102 \\ -38 \\ \hline 64 \end{array}$$

Find the difference:

$$45. \quad \text{between 28 and 46.} \quad 18 \quad 46. \quad \text{between 60 and 3.} \quad 57$$

$$47. \quad \text{between 70 and 11.} \quad 59 \quad 48. \quad \text{between 29 and 105.} \quad 76$$

Solve.

$$49. \quad \text{Mrs. Smith had 75 rulers.} \quad 50. \quad \text{Mr. Jones had 75 erasers.} \\ \text{Her class of 27 students} \quad \text{He got 18 more erasers} \\ \text{used 28 of them.} \quad \text{for 3 new students.}$$

$$\text{How many rulers were left?} \quad 47$$

$$\text{How many erasers in all?} \quad 93$$

# Cumulative Test

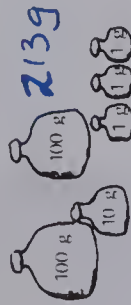
## UNITS 6-10

Pick the more reasonable mass and length.

1. 20 cm long or 1 m long

2. 80 g or 80 kg

3. How heavy?



213 g

4. What time?



Complete the pattern.

5. 3, 6, 9, 12, 15, 18, 21  
6. 5, 10, 15, 20, 25, 30, 35, 40

Multiply.

7.  $3 \times 3 = 9$  8.  $2 \times 8 = 16$  9.  $4 \times 5 = 20$  10.  $6 \times 0 = 0$

11.  $5 \times 9 = 45$  12.  $8 \times 1 = 8$  13.  $3 \times 7 = 21$  14.  $5 \times 5 = 25$

Divide.

15.  $8 \div 2 = 4$  16.  $12 \div 3 = 4$  17.  $16 \div 4 = 4$  18.  $40 \div 5 = 8$

19.  $0 \div 3 = 0$  20.  $20 \div 5 = 4$  21.  $6 \div 1 = 6$  22.  $32 \div 4 = 8$

23. How many days in

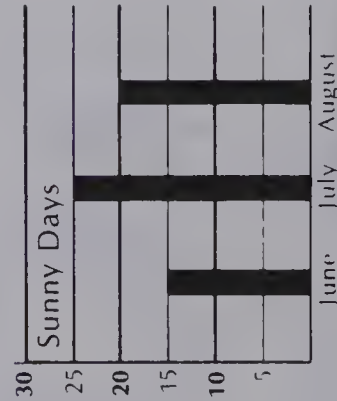
August were sunny? 20 days

24. In which month were

the fewest sunny days? June

25. What was the difference

between July and June? 10 days



Add.

$$\begin{array}{r} 26. \quad 624 \\ + 305 \\ \hline 929 \end{array}$$

$$\begin{array}{r} 30. \quad 284 \\ + 217 \\ \hline 501 \end{array}$$

34. Round 379 to the nearest 10. 380

35. Round 451 to the nearest 100. 500

36. Estimate the sum:  $379 + 208$  600 approximately 587

Subtract.

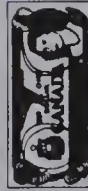
$$\begin{array}{r} 37. \quad 765 \\ - 234 \\ \hline 531 \end{array}$$

$$\begin{array}{r} 41. \quad 821 \\ - 64 \\ \hline 757 \end{array}$$

$$\begin{array}{r} 45. \quad 202 \\ - 28 \\ \hline 174 \end{array}$$

49. Find the difference between \$6.35 and \$4.25. \$2.10

50. How much money? \$1.46







# Cumulative Test

## UNITS 11-15

Give the answers.

	Name	Number of		
		Faces	Edges	Corners
	1. <input type="checkbox"/> <i>cube</i>	2. <input type="checkbox"/> <i>6</i>	3. <input type="checkbox"/> <i>12</i>	4. <input type="checkbox"/> <i>8</i>
	5. <input type="checkbox"/> <i>cylinder</i>	6. <input type="checkbox"/> <i>2</i>	7. <input type="checkbox"/> <i>2</i>	8. <input type="checkbox"/> <i>0</i>

9. What is at (2,4)? *B*

10. Where is the ●? *(5,4)*

11. If the ● slides left one and down two, where will it be? *C*

5									
4									
3									
2									
1									

Multiply.

12.  $\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$     13.  $\begin{array}{r} 0 \\ \times 6 \\ \hline 0 \end{array}$     14.  $\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \end{array}$     15.  $\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$
16.  $3 \times 7$  *21*    17.  $9 \times 7$  *63*    18.  $7 \times 5$  *35*    19.  $7 \times 7$  *49*
20.  $\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$     21.  $\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$     22.  $\begin{array}{r} 1 \\ \times 9 \\ \hline 9 \end{array}$     23.  $\begin{array}{r} 9 \\ \times 3 \\ \hline 27 \end{array}$
24. How many days in 3 weeks? *21*
25. How many week days in 8 weeks? *40*

Divide.

26.  $\begin{array}{r} 9 \\ 2 \overline{)18} \end{array}$     27.  $\begin{array}{r} 4 \\ 5 \overline{)20} \end{array}$     28.  $\begin{array}{r} 5R1 \\ 3 \overline{)16} \end{array}$     29.  $\begin{array}{r} 6 \\ 4 \overline{)24} \end{array}$
30.  $\begin{array}{r} 4R1 \\ 5 \overline{)21} \end{array}$     31.  $\begin{array}{r} 7R2 \\ 4 \overline{)30} \end{array}$     32.  $\begin{array}{r} 9R1 \\ 2 \overline{)19} \end{array}$     33.  $\begin{array}{r} 9R2 \\ 3 \overline{)29} \end{array}$

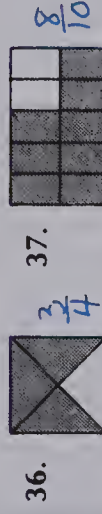
How many complete cards can be made with 21 problems?

How many problems will be left over for each?

34. 5 problems per card  
*4 cards, 1 left over*

35. 3 problems per card  
*7 cards, none left over*

Write the fraction.



Put these in order.

40. 0.6, 1.5, 0.7, 1.3.  
*0.6, 0.7, 1.3, 1.5*

Change to metres.

41. 6 m and 25 cm    *6.25 m*

Add.

42.  $0.6 + 0.7$     *1.3*

Subtract.

43.  $\$6.53 - \$2.27$     *\\$4.26*

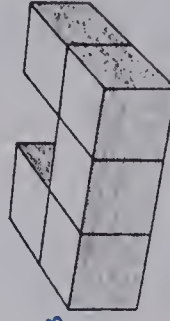
44. Which unit?

litres or metres?



*litres*

45. How many cubic centimetres?



*5 cm<sup>3</sup>*

Multiply.

46.  $\begin{array}{r} 10 \\ \times 5 \\ \hline 50 \end{array}$     47.  $\begin{array}{r} 100 \\ \times 8 \\ \hline 800 \end{array}$     48.  $\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$     49.  $\begin{array}{r} 32 \\ \times 4 \\ \hline 128 \end{array}$     50.  $\begin{array}{r} 15 \\ \times 3 \\ \hline 45 \end{array}$

# Addition Facts

Add.

1.  $\begin{array}{r} 8 \\ +8 \\ \hline 16 \end{array}$
2.  $\begin{array}{r} 6 \\ +4 \\ \hline 10 \end{array}$
3.  $\begin{array}{r} 7 \\ +7 \\ \hline 14 \end{array}$
4.  $\begin{array}{r} 3 \\ +7 \\ \hline 10 \end{array}$
5.  $\begin{array}{r} 9 \\ +2 \\ \hline 11 \end{array}$
6.  $\begin{array}{r} 8 \\ +7 \\ \hline 15 \end{array}$
7.  $\begin{array}{r} 6 \\ +9 \\ \hline 15 \end{array}$
8.  $\begin{array}{r} 8 \\ +5 \\ \hline 13 \end{array}$
9.  $\begin{array}{r} 4 \\ +5 \\ \hline 9 \end{array}$
10.  $\begin{array}{r} 4 \\ +7 \\ \hline 11 \end{array}$
11.  $\begin{array}{r} 3 \\ +6 \\ \hline 9 \end{array}$
12.  $\begin{array}{r} 7 \\ +6 \\ \hline 13 \end{array}$
13.  $\begin{array}{r} 8 \\ +0 \\ \hline 8 \end{array}$
14.  $\begin{array}{r} 7 \\ +5 \\ \hline 12 \end{array}$
15.  $\begin{array}{r} 0 \\ +3 \\ \hline 3 \end{array}$
16.  $\begin{array}{r} 9 \\ +9 \\ \hline 18 \end{array}$
17.  $\begin{array}{r} 3 \\ +8 \\ \hline 11 \end{array}$
18.  $\begin{array}{r} 5 \\ +9 \\ \hline 14 \end{array}$
19.  $\begin{array}{r} 2 \\ +6 \\ \hline 8 \end{array}$
20.  $\begin{array}{r} 9 \\ +1 \\ \hline 10 \end{array}$

# Subtraction Facts

Subtract.

1.  $\begin{array}{r} 13 \\ -4 \\ \hline 9 \end{array}$
2.  $\begin{array}{r} 10 \\ -7 \\ \hline 3 \end{array}$
3.  $\begin{array}{r} 12 \\ -6 \\ \hline 6 \end{array}$
4.  $\begin{array}{r} 7 \\ -0 \\ \hline 7 \end{array}$
5.  $\begin{array}{r} 18 \\ -9 \\ \hline 9 \end{array}$
6.  $\begin{array}{r} 17 \\ -8 \\ \hline 9 \end{array}$
7.  $\begin{array}{r} 14 \\ -8 \\ \hline 6 \end{array}$
8.  $\begin{array}{r} 9 \\ -1 \\ \hline 8 \end{array}$
9.  $\begin{array}{r} 10 \\ -4 \\ \hline 6 \end{array}$
10.  $\begin{array}{r} 15 \\ -7 \\ \hline 8 \end{array}$
11.  $\begin{array}{r} 16 \\ -9 \\ \hline 7 \end{array}$
12.  $\begin{array}{r} 10 \\ -2 \\ \hline 8 \end{array}$
13.  $\begin{array}{r} 13 \\ -5 \\ \hline 8 \end{array}$
14.  $\begin{array}{r} 11 \\ -6 \\ \hline 5 \end{array}$
15.  $\begin{array}{r} 11 \\ -4 \\ \hline 7 \end{array}$
16.  $\begin{array}{r} 12 \\ -3 \\ \hline 9 \end{array}$
17.  $\begin{array}{r} 14 \\ -5 \\ \hline 9 \end{array}$
18.  $\begin{array}{r} 13 \\ -9 \\ \hline 4 \end{array}$
19.  $\begin{array}{r} 14 \\ -6 \\ \hline 8 \end{array}$
20.  $\begin{array}{r} 13 \\ -5 \\ \hline 8 \end{array}$

# Multiplication Facts

Multiply.

1.  $\begin{array}{r} 3 \\ \times 2 \\ \hline 6 \end{array}$
2.  $\begin{array}{r} 6 \\ \times 5 \\ \hline 30 \end{array}$
3.  $\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$
4.  $\begin{array}{r} 8 \\ \times 1 \\ \hline 8 \end{array}$
5.  $\begin{array}{r} 5 \\ \times 9 \\ \hline 45 \end{array}$
6.  $\begin{array}{r} 0 \\ \times 4 \\ \hline 0 \end{array}$
7.  $\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$
8.  $\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$
9.  $\begin{array}{r} 3 \\ \times 7 \\ \hline 21 \end{array}$
10.  $\begin{array}{r} 9 \\ \times 2 \\ \hline 18 \end{array}$
11.  $\begin{array}{r} 1 \\ \times 1 \\ \hline 1 \end{array}$
12.  $\begin{array}{r} 4 \\ \times 6 \\ \hline 24 \end{array}$
13.  $\begin{array}{r} 5 \\ \times 7 \\ \hline 35 \end{array}$
14.  $\begin{array}{r} 2 \\ \times 2 \\ \hline 4 \end{array}$
15.  $\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$
16.  $\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$
17.  $\begin{array}{r} 4 \\ \times 3 \\ \hline 12 \end{array}$
18.  $\begin{array}{r} 6 \\ \times 0 \\ \hline 0 \end{array}$
19.  $\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$
20.  $\begin{array}{r} 3 \\ \times 9 \\ \hline 27 \end{array}$

# Division Facts

Divide.

1.  $\begin{array}{r} 7 \\ 3 \overline{)21} \end{array}$
2.  $\begin{array}{r} 3 \\ 5 \overline{)15} \end{array}$
3.  $\begin{array}{r} 0 \\ 3 \overline{)0} \end{array}$
4.  $\begin{array}{r} 4 \\ 4 \overline{)16} \end{array}$
5.  $\begin{array}{r} 7 \\ 5 \overline{)35} \end{array}$
6.  $\begin{array}{r} 6 \\ 3 \overline{)18} \end{array}$
7.  $\begin{array}{r} 3 \\ 2 \overline{)6} \end{array}$
8.  $\begin{array}{r} 7 \\ 4 \overline{)28} \end{array}$
9.  $\begin{array}{r} 6 \\ 5 \overline{)30} \end{array}$
10.  $\begin{array}{r} 4 \\ 1 \overline{)4} \end{array}$
11.  $\begin{array}{r} 9 \\ 3 \overline{)27} \end{array}$
12.  $\begin{array}{r} 8 \\ 3 \overline{)24} \end{array}$
13.  $\begin{array}{r} 9 \\ 4 \overline{)36} \end{array}$
14.  $\begin{array}{r} 3 \\ 3 \overline{)9} \end{array}$
15.  $\begin{array}{r} 0 \\ 1 \overline{)0} \end{array}$
16.  $\begin{array}{r} 4 \\ 5 \overline{)20} \end{array}$
17.  $\begin{array}{r} 9 \\ 2 \overline{)18} \end{array}$
18.  $\begin{array}{r} 8 \\ 4 \overline{)32} \end{array}$
19.  $\begin{array}{r} 5 \\ 3 \overline{)15} \end{array}$
20.  $\begin{array}{r} 8 \\ 2 \overline{)16} \end{array}$
21.  $\begin{array}{r} 2 \\ 3 \overline{)6} \end{array}$
22.  $\begin{array}{r} 6 \\ 4 \overline{)24} \end{array}$
23.  $\begin{array}{r} 2 \\ 5 \overline{)10} \end{array}$
24.  $\begin{array}{r} 7 \\ 2 \overline{)14} \end{array}$
25.  $\begin{array}{r} 5 \\ 5 \overline{)25} \end{array}$
26.  $\begin{array}{r} 1 \\ 2 \overline{)2} \end{array}$
27.  $\begin{array}{r} 5 \\ 4 \overline{)20} \end{array}$
28.  $\begin{array}{r} 4 \\ 3 \overline{)12} \end{array}$
29.  $\begin{array}{r} 9 \\ 5 \overline{)45} \end{array}$
30.  $\begin{array}{r} 5 \\ 2 \overline{)10} \end{array}$



Add.		Addition	
1.	$\begin{array}{r} 36 \\ + 24 \\ \hline 60 \end{array}$	4.	$\begin{array}{r} 39 \\ + 6 \\ \hline 45 \end{array}$
2.	$\begin{array}{r} 27 \\ + 38 \\ \hline 65 \end{array}$	5.	$\begin{array}{r} 15 \\ + 33 \\ \hline 48 \end{array}$
3.	$\begin{array}{r} 38 \\ + 43 \\ \hline 81 \end{array}$	6.	$\begin{array}{r} 98 \\ + 2 \\ \hline 100 \end{array}$
4.	$\begin{array}{r} 39 \\ + 6 \\ \hline 45 \end{array}$	7.	$\begin{array}{r} 11 \\ + 99 \\ \hline 110 \end{array}$
5.	$\begin{array}{r} 15 \\ + 33 \\ \hline 48 \end{array}$	8.	$\begin{array}{r} 23 \\ + 48 \\ \hline 71 \end{array}$
6.	$\begin{array}{r} 98 \\ + 2 \\ \hline 100 \end{array}$	9.	$\begin{array}{r} 43 \\ + 28 \\ \hline 71 \end{array}$
7.	$\begin{array}{r} 11 \\ + 99 \\ \hline 110 \end{array}$	10.	$\begin{array}{r} 66 \\ + 78 \\ \hline 144 \end{array}$
8.	$\begin{array}{r} 23 \\ + 48 \\ \hline 71 \end{array}$	11.	$\begin{array}{r} 37 \\ + 84 \\ \hline 121 \end{array}$
9.	$\begin{array}{r} 43 \\ + 28 \\ \hline 71 \end{array}$	12.	$\begin{array}{r} 54 \\ + 26 \\ \hline 80 \end{array}$
10.	$\begin{array}{r} 66 \\ + 78 \\ \hline 144 \end{array}$	13.	$\begin{array}{r} 27 \\ + 61 \\ \hline 88 \end{array}$
11.	$\begin{array}{r} 37 \\ + 84 \\ \hline 121 \end{array}$	14.	$\begin{array}{r} 82 \\ + 73 \\ \hline 155 \end{array}$
12.	$\begin{array}{r} 54 \\ + 26 \\ \hline 80 \end{array}$	15.	$\begin{array}{r} 65 \\ + 47 \\ \hline 112 \end{array}$
13.	$\begin{array}{r} 27 \\ + 61 \\ \hline 88 \end{array}$	16.	$\begin{array}{r} 28 \\ + 63 \\ \hline 91 \end{array}$
14.	$\begin{array}{r} 82 \\ + 73 \\ \hline 155 \end{array}$	17.	$\begin{array}{r} 55 \\ + 53 \\ \hline 108 \end{array}$
15.	$\begin{array}{r} 65 \\ + 47 \\ \hline 112 \end{array}$	18.	$\begin{array}{r} 81 \\ + 92 \\ \hline 173 \end{array}$
16.	$\begin{array}{r} 28 \\ + 63 \\ \hline 91 \end{array}$	19.	$\begin{array}{r} 76 \\ + 47 \\ \hline 123 \end{array}$
17.	$\begin{array}{r} 55 \\ + 53 \\ \hline 108 \end{array}$	20.	$\begin{array}{r} 32 \\ + 98 \\ \hline 130 \end{array}$
18.	$\begin{array}{r} 81 \\ + 92 \\ \hline 173 \end{array}$		
19.	$\begin{array}{r} 76 \\ + 47 \\ \hline 123 \end{array}$		
20.	$\begin{array}{r} 32 \\ + 98 \\ \hline 130 \end{array}$		

Subtract.		Subtraction	
1.	$\begin{array}{r} 86 \\ - 53 \\ \hline 33 \end{array}$	4.	$\begin{array}{r} 40 \\ - 19 \\ \hline 21 \end{array}$
2.	$\begin{array}{r} 65 \\ - 5 \\ \hline 60 \end{array}$	5.	$\begin{array}{r} 46 \\ - 17 \\ \hline 29 \end{array}$
3.	$\begin{array}{r} 98 \\ - 29 \\ \hline 69 \end{array}$	6.	$\begin{array}{r} 80 \\ - 11 \\ \hline 69 \end{array}$
4.	$\begin{array}{r} 40 \\ - 19 \\ \hline 21 \end{array}$	7.	$\begin{array}{r} 94 \\ - 26 \\ \hline 68 \end{array}$
5.	$\begin{array}{r} 46 \\ - 17 \\ \hline 29 \end{array}$	8.	$\begin{array}{r} 55 \\ - 46 \\ \hline 9 \end{array}$
6.	$\begin{array}{r} 80 \\ - 11 \\ \hline 69 \end{array}$	9.	$\begin{array}{r} 98 \\ - 27 \\ \hline 71 \end{array}$
7.	$\begin{array}{r} 94 \\ - 26 \\ \hline 68 \end{array}$	10.	$\begin{array}{r} 35 \\ - 18 \\ \hline 17 \end{array}$
8.	$\begin{array}{r} 55 \\ - 46 \\ \hline 9 \end{array}$	11.	$\begin{array}{r} 135 \\ - 43 \\ \hline 92 \end{array}$
9.	$\begin{array}{r} 98 \\ - 27 \\ \hline 71 \end{array}$	12.	$\begin{array}{r} 121 \\ - 41 \\ \hline 80 \end{array}$
10.	$\begin{array}{r} 35 \\ - 18 \\ \hline 17 \end{array}$	13.	$\begin{array}{r} 127 \\ - 48 \\ \hline 79 \end{array}$
11.	$\begin{array}{r} 135 \\ - 43 \\ \hline 92 \end{array}$	14.	$\begin{array}{r} 120 \\ - 72 \\ \hline 48 \end{array}$
12.	$\begin{array}{r} 121 \\ - 41 \\ \hline 80 \end{array}$	15.	$\begin{array}{r} 115 \\ - 18 \\ \hline 97 \end{array}$
13.	$\begin{array}{r} 127 \\ - 48 \\ \hline 79 \end{array}$	16.	$\begin{array}{r} 105 \\ - 68 \\ \hline 37 \end{array}$
14.	$\begin{array}{r} 120 \\ - 72 \\ \hline 48 \end{array}$	17.	$\begin{array}{r} 103 \\ - 9 \\ \hline 94 \end{array}$
15.	$\begin{array}{r} 115 \\ - 18 \\ \hline 97 \end{array}$	18.	$\begin{array}{r} 87 \\ - 38 \\ \hline 49 \end{array}$
16.	$\begin{array}{r} 105 \\ - 68 \\ \hline 37 \end{array}$	19.	$\begin{array}{r} 100 \\ - 23 \\ \hline 77 \end{array}$
17.	$\begin{array}{r} 103 \\ - 9 \\ \hline 94 \end{array}$	20.	$\begin{array}{r} 103 \\ - 21 \\ \hline 82 \end{array}$
18.	$\begin{array}{r} 87 \\ - 38 \\ \hline 49 \end{array}$		
19.	$\begin{array}{r} 100 \\ - 23 \\ \hline 77 \end{array}$		
20.	$\begin{array}{r} 103 \\ - 21 \\ \hline 82 \end{array}$		

Add.		Addition	
1.	$\begin{array}{r} 236 \\ + 153 \\ \hline 389 \end{array}$	4.	$\begin{array}{r} 358 \\ + 605 \\ \hline 963 \end{array}$
2.	$\begin{array}{r} 384 \\ + 605 \\ \hline 989 \end{array}$	5.	$\begin{array}{r} 651 \\ + 263 \\ \hline 914 \end{array}$
3.	$\begin{array}{r} 327 \\ + 334 \\ \hline 661 \end{array}$	6.	$\begin{array}{r} 271 \\ + 382 \\ \hline 653 \end{array}$
4.	$\begin{array}{r} 358 \\ + 605 \\ \hline 963 \end{array}$	7.	$\begin{array}{r} 364 \\ + 248 \\ \hline 612 \end{array}$
5.	$\begin{array}{r} 651 \\ + 263 \\ \hline 914 \end{array}$	8.	$\begin{array}{r} 400 \\ + 390 \\ \hline 790 \end{array}$
6.	$\begin{array}{r} 271 \\ + 382 \\ \hline 653 \end{array}$	9.	$\begin{array}{r} 392 \\ + 58 \\ \hline 450 \end{array}$
7.	$\begin{array}{r} 364 \\ + 248 \\ \hline 612 \end{array}$	10.	$\begin{array}{r} 222 \\ + 487 \\ \hline 709 \end{array}$
8.	$\begin{array}{r} 400 \\ + 390 \\ \hline 790 \end{array}$	11.	$\begin{array}{r} 826 \\ + 94 \\ \hline 920 \end{array}$
9.	$\begin{array}{r} 392 \\ + 58 \\ \hline 450 \end{array}$	12.	$\begin{array}{r} 766 \\ + 178 \\ \hline 944 \end{array}$
10.	$\begin{array}{r} 222 \\ + 487 \\ \hline 709 \end{array}$	13.	$\begin{array}{r} 903 \\ + 69 \\ \hline 972 \end{array}$
11.	$\begin{array}{r} 826 \\ + 94 \\ \hline 920 \end{array}$	14.	$\begin{array}{r} 376 \\ + 328 \\ \hline 704 \end{array}$
12.	$\begin{array}{r} 766 \\ + 178 \\ \hline 944 \end{array}$	15.	$\begin{array}{r} 718 \\ + 182 \\ \hline 900 \end{array}$
13.	$\begin{array}{r} 903 \\ + 69 \\ \hline 972 \end{array}$	16.	$\begin{array}{r} 5 \\ + 196 \\ \hline 201 \end{array}$
14.	$\begin{array}{r} 376 \\ + 328 \\ \hline 704 \end{array}$	17.	$\begin{array}{r} 843 \\ + 154 \\ \hline 997 \end{array}$
15.	$\begin{array}{r} 718 \\ + 182 \\ \hline 900 \end{array}$	18.	$\begin{array}{r} 627 \\ + 84 \\ \hline 711 \end{array}$
16.	$\begin{array}{r} 5 \\ + 196 \\ \hline 201 \end{array}$	19.	$\begin{array}{r} 785 \\ + 188 \\ \hline 973 \end{array}$
17.	$\begin{array}{r} 843 \\ + 154 \\ \hline 997 \end{array}$	20.	$\begin{array}{r} 236 \\ + 554 \\ \hline 790 \end{array}$
18.	$\begin{array}{r} 627 \\ + 84 \\ \hline 711 \end{array}$		
19.	$\begin{array}{r} 785 \\ + 188 \\ \hline 973 \end{array}$		
20.	$\begin{array}{r} 236 \\ + 554 \\ \hline 790 \end{array}$		

Subtract.		Subtraction	
1.	$\begin{array}{r} 365 \\ - 205 \\ \hline 160 \end{array}$	4.	$\begin{array}{r} 483 \\ - 226 \\ \hline 257 \end{array}$
2.	$\begin{array}{r} 658 \\ - 58 \\ \hline 600 \end{array}$	5.	$\begin{array}{r} 257 \\ - 38 \\ \hline 219 \end{array}$
3.	$\begin{array}{r} 291 \\ - 190 \\ \hline 101 \end{array}$	6.	$\begin{array}{r} 756 \\ - 84 \\ \hline 672 \end{array}$
4.	$\begin{array}{r} 483 \\ - 226 \\ \hline 257 \end{array}$	7.	$\begin{array}{r} 329 \\ - 139 \\ \hline 190 \end{array}$
5.	$\begin{array}{r} 257 \\ - 38 \\ \hline 219 \end{array}$	8.	$\begin{array}{r} 846 \\ - 119 \\ \hline 727 \end{array}$
6.	$\begin{array}{r} 756 \\ - 84 \\ \hline 672 \end{array}$	9.	$\begin{array}{r} 207 \\ - 26 \\ \hline 181 \end{array}$
7.	$\begin{array}{r} 329 \\ - 139 \\ \hline 190 \end{array}$	10.	$\begin{array}{r} 808 \\ - 112 \\ \hline 696 \end{array}$
8.	$\begin{array}{r} 846 \\ - 119 \\ \hline 727 \end{array}$	11.	$\begin{array}{r} 620 \\ - 307 \\ \hline 313 \end{array}$
9.	$\begin{array}{r} 207 \\ - 26 \\ \hline 181 \end{array}$	12.	$\begin{array}{r} 431 \\ - 388 \\ \hline 43 \end{array}$
10.	$\begin{array}{r} 808 \\ - 112 \\ \hline 696 \end{array}$	13.	$\begin{array}{r} 711 \\ - 199 \\ \hline 512 \end{array}$
11.	$\begin{array}{r} 620 \\ - 307 \\ \hline 313 \end{array}$	14.	$\begin{array}{r} 431 \\ - 283 \\ \hline 148 \end{array}$
12.	$\begin{array}{r} 431 \\ - 388 \\ \hline 43 \end{array}$	15.	$\begin{array}{r} 458 \\ - 264 \\ \hline 194 \end{array}$
13.	$\begin{array}{r} 711 \\ - 199 \\ \hline 512 \end{array}$	16.	$\begin{array}{r} 820 \\ - 179 \\ \hline 641 \end{array}$
14.	$\begin{array}{r} 431 \\ - 283 \\ \hline 148 \end{array}$	17.	$\begin{array}{r} 206 \\ - 118 \\ \hline 88 \end{array}$
15.	$\begin{array}{r} 458 \\ - 264 \\ \hline 194 \end{array}$	18.	$\begin{array}{r} 900 \\ - 225 \\ \hline 675 \end{array}$
16.	$\begin{array}{r} 820 \\ - 179 \\ \hline 641 \end{array}$	19.	$\begin{array}{r} 600 \\ - 136 \\ \hline 464 \end{array}$
17.	$\begin{array}{r} 206 \\ - 118 \\ \hline 88 \end{array}$	20.	$\begin{array}{r} 438 \\ - 339 \\ \hline 99 \end{array}$
18.	$\begin{array}{r} 900 \\ - 225 \\ \hline 675 \end{array}$		
19.	$\begin{array}{r} 600 \\ - 136 \\ \hline 464 \end{array}$		
20.	$\begin{array}{r} 438 \\ - 339 \\ \hline 99 \end{array}$		

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